

EXHIBIT 4
FERC FEIS for MIDSHIP Project



**Federal Energy
Regulatory
Commission**

**Office of
Energy
Projects
June 2018**

FERC/FEIS-0277

**FINAL ENVIRONMENTAL IMPACT STATEMENT
FOR**

Midship Pipeline Company, LLC – Midcontinent Supply Header Interstate Pipeline Project

Volume I

Docket No. CP17-458-000



**Federal Energy Regulatory Commission
Office of Energy Projects
888 First Street, NE, Washington, DC 20426**

Cooperating Agency:



FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, D.C. 20426

OFFICE OF ENERGY PROJECTS

In Reply Refer To:
OEP/DG2E/Gas 1
Midship Pipeline Company, LLC
Midcontinent Supply Header Interstate
Pipeline Project
Docket No. CP17-458-000

TO THE PARTY ADDRESSED:

The staff of the Federal Energy Regulatory Commission (FERC or Commission) has prepared a final environmental impact statement (EIS) for the Midcontinent Supply Header Interstate Pipeline Project, proposed by Midship Pipeline Company, LLC (Midship Pipeline) in the above-referenced docket. Midship Pipeline requests authorization to construct and operate approximately 234.1 miles of new pipeline, three compressor stations, a booster station, and accompanying facilities in Oklahoma. The project would deliver an additional 1,440 million standard cubic feet per day of year-round firm transportation capacity from Kingfisher County, Oklahoma to existing natural gas pipelines near Bennington, Oklahoma for transport to growing Gulf Coast and Southeast Markets.

The final EIS assesses the potential environmental effects of the construction and operation of the project in accordance with the requirements of the National Environmental Policy Act (NEPA). The FERC staff concludes that approval of the project would result in some adverse environmental impacts; however, these impacts would be reduced to less-than-significant levels with the implementation of Midship Pipeline's proposed mitigation and the additional measures recommended in the final EIS.

The U.S. Environmental Protection Agency participated as a cooperating agency in the preparation of the EIS. Cooperating agencies have jurisdiction by law or special expertise with respect to resources potentially affected by the proposal and participate in the NEPA analysis. The U.S. Environmental Protection Agency provided input to the conclusions and recommendations presented in the final EIS.

The final EIS addresses the potential environmental effects of the construction and operation of the following proposed project facilities in Oklahoma:

- 199.7 miles of new 36-inch-diameter natural gas pipeline in Kingfisher, Canadian, Grady, Garvin, Stephens, Carter, Johnston, and Bryan Counties;
- 20.5 miles of new 30-inch-diameter pipeline lateral in Kingfisher County;

- 2 -

- 13.8 miles of new 16-inch-diameter pipeline lateral in Stephens, Carter, and Garvin Counties;
- 0.1 mile of new 24-inch-diameter tie-in piping in Canadian County;
- three new compressor stations and one new booster station in Canadian, Garvin, Bryan, and Stephens Counties; and
- eight new receipt meters, two new receipt taps, four new delivery meters, and appurtenant facilities.

The FERC staff mailed copies of the EIS to federal, state, and local government representatives and agencies; elected officials; environmental and public interest groups; Native American tribes; potentially affected landowners and other interested individuals and groups; and newspapers and libraries in the project area. Paper copy versions of Volume I of this EIS were mailed to those specifically requesting them; all recipients received a CD version containing both Volumes I and II of the EIS. In addition, the EIS is available for public viewing on the FERC's website (www.ferc.gov) using the eLibrary link. A limited number of copies are available for distribution and public inspection at:

Federal Energy Regulatory Commission
Public Reference Room
888 First Street NE, Room 2A
Washington, DC 20426
(202) 502-8371

Questions?

Additional information about the project is available from the Commission's Office of External Affairs, at (866) 208-FERC, or on the FERC website (www.ferc.gov) using the eLibrary link. Click on the eLibrary link, click on "General Search," and enter the docket number in the "Docket Number" field excluding the last three digits (i.e., CP17-458). Be sure you have selected an appropriate date range. For assistance, please contact FERC Online Support at FercOnlineSupport@ferc.gov or toll free at (866) 208-3676; for TTY, contact (202) 502-8659. The eLibrary link also provides access to the texts of all formal documents issued by the Commission, such as orders, notices, and rulemakings.

In addition, the Commission offers a free service called eSubscription, which allows you to keep track of all formal issuances and submittals in specific dockets. This can reduce the amount of time you spend researching proceedings by automatically providing you with notification of these filings, document summaries, and direct links to the documents. Go to www.ferc.gov/docs-filing/esubscription.asp.

TABLE OF CONTENTS

Midship Pipeline Company, LLC Midcontinent Supply Header Interstate Pipeline Project Final Environmental Impact Statement

	<u>Page</u>
<u>VOLUME I</u>	
TABLE OF CONTENTS.....	i
LIST OF TABLES.....	vii
LIST OF FIGURES	ix
LIST OF APPENDICES.....	x
TECHNICAL ACRONYMS AND ABBREVIATIONS.....	xi
 EXECUTIVE SUMMARY	 ES-1
INTRODUCTION	ES-1
PROPOSED ACTION	ES-1
PUBLIC INVOLVEMENT	ES-2
ENVIRONMENTAL IMPACTS AND MITIGATION	ES-3
ALTERNATIVES CONSIDERED	ES-13
CONCLUSIONS	ES-14
 1.0 INTRODUCTION.....	 1-1
1.1 PROJECT PURPOSE AND NEED	1-2
1.2 PURPOSE AND SCOPE OF THIS STATEMENT	1-2
1.2.1 Federal Energy Regulatory Commission	1-3
1.2.2 U.S. Environmental Protection Agency – Region 6	1-3
1.3 PUBLIC REVIEW AND COMMENT	1-4
1.4 NON-JURISDICTIONAL FACILITIES	1-8
1.5 PERMITS, APPROVALS, AND REGULATORY REVIEWS	1-8
 2.0 PROPOSED ACTION.....	 2-1
2.1 PROPOSED FACILITIES.....	2-1
2.1.1 Pipeline Facilities.....	2-1
2.1.1.1 Mainline.....	2-3
2.1.1.2 Chisholm Lateral.....	2-3
2.1.1.3 Velma Lateral	2-3
2.1.1.4 Tie-in Piping	2-3
2.1.2 Aboveground Facilities.....	2-3
2.2 LAND REQUIREMENTS.....	2-6
2.2.1 Pipeline Facilities.....	2-6
2.2.1.1 Collocation with Existing Rights-of-Way and Utility Crossings.....	2-6
2.2.2 Right-of-Way Configurations	2-6
2.2.3 Additional Temporary Workspace.....	2-8
2.2.4 Aboveground Facilities.....	2-8
2.2.5 Contractor Yards and Staging Areas.....	2-8
2.2.6 Access Roads	2-9

TABLE OF CONTENTS (cont'd)

2.3	CONSTRUCTION PROCEDURES.....	2-9
2.3.1	General Pipeline Construction Procedures	2-10
2.3.2	Specialized Construction Procedures.....	2-15
2.3.3	Aboveground Facility Construction Procedures	2-20
2.4	CONSTRUCTION SCHEDULE.....	2-22
2.5	ENVIRONMENTAL COMPLIANCE INSPECTION AND MITIGATION MONITORING.....	2-22
2.5.1	Coordination and Training.....	2-22
2.5.2	Environmental Inspection.....	2-22
2.5.3	FERC Third-Party Compliance Monitoring	2-23
2.5.4	Post-Approval Variance Process	2-23
2.5.5	Post-Construction Monitoring	2-24
2.6	OPERATION, MAINTENANCE, AND SAFETY PROCEDURES	2-25
3.0	ALTERNATIVES	3-1
3.1	NO-ACTION ALTERNATIVE.....	3-2
3.2	SYSTEM ALTERNATIVES.....	3-2
3.3	ALTERNATIVE PIPELINE ROUTES	3-3
3.4	ALTERNATIVE ABOVEGROUND FACILITY SITES	3-6
4.0	ENVIRONMENTAL ANALYSIS.....	4-1
4.1	GEOLOGY	4-1
4.1.1	Physiographic Setting	4-1
4.1.2	Geologic Setting	4-2
4.1.2.1	Surficial and Bedrock Geology.....	4-2
4.1.2.2	Shallow Bedrock and Blasting.....	4-2
4.1.3	Mineral Resources	4-4
4.1.4	Geologic Hazards.....	4-5
4.1.4.1	Seismicity.....	4-5
4.1.4.2	Active Faults	4-10
4.1.4.3	Soil Liquefaction.....	4-11
4.1.4.4	Landslides	4-12
4.1.4.5	Flash Flooding	4-12
4.1.4.6	Karst Topography	4-13
4.1.5	Paleontological Resources	4-13
4.1.6	General Impacts and Mitigation.....	4-13
4.2	SOILS	4-15
4.2.1	Existing Soil Resources	4-15
4.2.1.1	Pipeline Facilities.....	4-15
4.2.1.2	Aboveground Facilities.....	4-19
4.2.1.3	Contractor Yards.....	4-19
4.2.1.4	Access Roads	4-19

TABLE OF CONTENTS (cont'd)

4.2.2	General Impacts and Mitigation.....	4-19
4.2.2.1	Prime Farmland.....	4-19
4.2.2.2	Hydric Soils and Compaction Potential.....	4-20
4.2.2.3	Soil Erosion.....	4-21
4.2.2.4	Post-Construction Revegetation.....	4-21
4.2.2.5	Shallow Bedrock and Rocky Soils.....	4-21
4.2.2.6	Soil Contamination	4-22
4.2.2.7	Conclusion	4-22
4.3	WATER RESOURCES	4-23
4.3.1	Groundwater Resources	4-23
4.3.1.1	Existing Groundwater Resources.....	4-23
4.3.1.2	Sole Source Aquifers	4-26
4.3.1.3	State-Designated Aquifers	4-26
4.3.1.4	Water Supply Wells and Springs	4-26
4.3.1.5	Wellhead Protection Areas	4-26
4.3.1.6	Contaminated Groundwater	4-27
4.3.1.7	Groundwater Impacts and Mitigation	4-28
4.3.1.8	Conclusion	4-30
4.3.2	Surface Water	4-30
4.3.2.1	Existing Surface Water Resources.....	4-30
4.3.2.2	Source Water Protection Areas and/or Public Watersheds	4-32
4.3.2.3	Water Classifications	4-32
4.3.2.4	Sensitive Waterbodies.....	4-34
4.3.2.5	Waterbody Construction Procedures	4-37
4.3.2.6	Surface Water Impacts and Mitigation	4-43
4.3.2.7	Conclusion	4-48
4.4	WETLANDS	4-51
4.4.1	Existing Wetland Resources	4-51
4.4.2	Wetland Classifications	4-51
4.4.3	Wetland Construction Procedures.....	4-54
4.4.4	General Impacts and Mitigation.....	4-54
4.4.5	Extra Workspaces Within 50 Feet of Wetlands	4-57
4.4.6	Compensatory Mitigation	4-57
4.4.7	Conclusion	4-58
4.5	VEGETATION	4-58
4.5.1	Existing Vegetation Conditions	4-58
4.5.1.1	Pipeline Facilities.....	4-59
4.5.1.2	Aboveground Facilities, Access Roads, and Contractor Yards	4-60
4.5.2	Vegetation Communities of Special Concern or Value	4-61
4.5.3	Noxious Weeds, Invasive Plant Species, and Plant Disease Prevention.....	4-61
4.5.4	General Impacts and Mitigation.....	4-61
4.5.5	Conclusion	4-65
4.6	WILDLIFE AND AQUATIC RESOURCES	4-65
4.6.1	Existing Wildlife Resources	4-65
4.6.1.1	Significant or Sensitive Wildlife Habitats	4-66
4.6.1.2	General Impacts and Mitigation for Wildlife.....	4-67
4.6.1.3	Conclusion	4-69

TABLE OF CONTENTS (cont'd)

4.6.2	Existing Aquatic Resources	4-69
4.6.2.1	Fisheries of Special Concern	4-70
4.6.2.2	General Impacts and Mitigation.....	4-70
4.6.2.3	Conclusion	4-73
4.7	THREATENED, ENDANGERED, AND OTHER SPECIAL STATUS SPECIES	4-73
4.7.1	Federally Listed Species	4-74
4.7.1.1	Black-capped Vireo	4-77
4.7.1.2	Least Tern	4-78
4.7.1.3	Piping Plover.....	4-78
4.7.1.4	Rufa Red Knot	4-79
4.7.1.5	Whooping Crane.....	4-79
4.7.1.6	Arkansas River Shiner	4-80
4.7.1.7	American Burying Beetle	4-81
4.7.1.8	Conclusion	4-83
4.7.2	Migratory Birds.....	4-84
4.7.3	Bald and Golden Eagles.....	4-88
4.7.4	State-listed Species	4-88
4.8	LAND USE, SPECIAL INTEREST AREAS, AND VISUAL RESOURCES	4-89
4.8.1	Land Use.....	4-89
4.8.1.1	Environmental Setting	4-89
4.8.1.2	Pipeline Facilities.....	4-90
4.8.1.3	Aboveground Facilities.....	4-94
4.8.1.4	Contractor Yards.....	4-95
4.8.1.5	Access roads	4-95
4.8.2	Land Ownership and Easement Requirements	4-96
4.8.3	Existing Residences, Commercial and Industrial Facilities, and Planned Developments	4-96
4.8.3.1	Existing Residential and Commercial Structures.....	4-96
4.8.3.2	Planned Developments	4-99
4.8.4	Agricultural Areas.....	4-99
4.8.5	Public Land, Recreation, and Other Special Interest Areas.....	4-103
4.8.5.1	Commissioners of the Land Office Lands	4-103
4.8.5.2	Recreation and Special Interest Areas	4-104
4.8.6	Coastal Zone Management Act.....	4-106
4.8.7	Contaminated Sites	4-106
4.8.8	Visual Resources.....	4-106
4.8.8.1	Pipeline Facilities.....	4-106
4.8.8.2	Aboveground Facilities.....	4-107
4.9	SOCIOECONOMICS	4-109
4.9.1	Socioeconomic Study Area.....	4-109
4.9.2	Population and Employment.....	4-110
4.9.3	Housing.....	4-113
4.9.4	Public Services.....	4-114
4.9.5	Transportation and Traffic	4-115
4.9.6	Property Values and Insurance	4-118
4.9.7	Economy and Tax Revenues.....	4-119
4.9.8	Environmental Justice.....	4-120
4.9.9	Conclusion	4-124

TABLE OF CONTENTS (cont'd)

4.10	CULTURAL RESOURCES	4-124
4.10.1	Cultural Resources Consultations	4-125
4.10.1.1	State Historic Preservation Office	4-125
4.10.1.2	Other State and Federal Agencies.....	4-126
4.10.1.3	Federally Recognized Tribes	4-127
4.10.2	Results of Cultural Resources Surveys	4-130
4.10.3	Outstanding Cultural Resource Investigations.....	4-131
4.10.4	Unanticipated Discovery Procedures.....	4-132
4.10.5	General Impacts and Mitigation.....	4-132
4.11	AIR QUALITY AND NOISE	4-133
4.11.1	Air Quality	4-133
4.11.1.1	Regional Climate	4-133
4.11.1.2	Air Quality Regulatory Requirements	4-134
4.11.1.3	Air Emissions Impacts and Mitigation	4-137
4.11.1.4	Radon Exposure	4-146
4.11.2	Noise	4-147
4.11.2.1	Regulatory Noise Requirements	4-147
4.11.2.2	Noise Impacts and Mitigation.....	4-148
4.12	RELIABILITY AND SAFETY	4-158
4.12.1	Safety Standards	4-159
4.12.2	Pipeline Accident Data	4-165
4.12.3	Impact on Public Safety.....	4-166
4.12.4	Terrorism	4-168
4.13	CUMULATIVE IMPACTS.....	4-168
4.13.1	Projects and Activities Considered	4-171
4.13.1.1	FERC-Jurisdictional Natural Gas Pipeline Projects.....	4-171
4.13.1.2	Non-Jurisdictional Project-Related Actions.....	4-172
4.13.1.3	Oil and Natural Gas Production.....	4-172
4.13.1.4	Oil and Natural Gas Transport, Processing, and Storage.....	4-173
4.13.1.5	Electric Generation and Transmission Projects	4-175
4.13.1.6	Transportation and Commercial/Residential Development Projects.....	4-175
4.13.2	Potential Cumulative Resource Impacts of the Proposed Action	4-176
4.13.2.1	Geology and Soils.....	4-177
4.13.2.2	Water Resources	4-177
4.13.2.3	Vegetation and Wildlife.....	4-180
4.13.2.4	Fisheries and Other Aquatic Resources	4-181
4.13.2.5	Special Status Species.....	4-181
4.13.2.6	Land Use, Recreation, Special Interest Areas, Public Lands, and Visual Resources.....	4-182
4.13.2.7	Socioeconomics	4-184
4.13.2.8	Cultural Resources	4-186
4.13.2.9	Air Quality and Noise	4-187
4.13.2.10	Climate Change.....	4-190
4.13.3	Conclusion	4-192

TABLE OF CONTENTS (cont'd)

5.0	CONCLUSIONS AND RECOMMENDATIONS.....	5-1
5.1	SUMMARY OF THE ENVIRONMENTAL ANALYSIS.....	5-1
5.1.1	Geology.....	5-1
5.1.2	Soils	5-2
5.1.3	Water Resources	5-3
5.1.4	Wetlands	5-6
5.1.5	Vegetation.....	5-7
5.1.6	Wildlife and Aquatic Resources	5-8
5.1.7	Threatened, Endangered, and Other Special Status Species.....	5-10
5.1.8	Land Use, Recreation, and Visual Resources	5-13
5.1.9	Socioeconomics	5-16
5.1.10	Cultural Resources	5-16
5.1.11	Air Quality and Noise	5-17
5.1.12	Safety and Reliability.....	5-19
5.1.13	Cumulative Impacts	5-20
5.1.14	Alternatives.....	5-21
5.2	FERC STAFF'S RECOMMENDED MITIGATION.....	5-22

VOLUME II – APPENDICES (on compact disc only)

LIST OF TABLES

<u>Table No.</u>	<u>Title</u>	<u>Page</u>
Table 1.1-1	Customers and Transportation Capacity Subscribed to the MIDSHIP Project.....	1-2
Table 1.3-1	Environmental Concerns Identified for the MIDSHIP Project	1-6
Table 1.4-1	Non-jurisdictional Powerlines Associated with the MIDSHIP Project.....	1-9
Table 1.5-1	Major Permits, Approvals, and Consultations for the MIDSHIP Project	1-11
Table 2.1.1-1	Summary of Pipeline Facilities Associated with the MIDSHIP Project	2-1
Table 2.1.2-1	Summary of Aboveground Facilities Associated with the MIDSHIP Project	2-4
Table 2.2-1	Summary of Land Requirements for the MIDSHIP Project.....	2-7
Table 2.3-1	Summary of Proposed Modifications to the FERC Procedures	2-10
Table 2.3.2-1	Proposed Horizontal Directional Drills Associated with the MIDSHIP Project.....	2-18
Table 3.3-1	Summary of Route Variations Incorporated into the Proposed Route for the MIDSHIP Project	3-5
Table 4.1.2-1	Geologic Materials and Elevations Crossed by the MIDSHIP Project	4-3
Table 4.1.2-2	Potential Areas of Shallow Bedrock Crossed by the MIDSHIP Project	4-4
Table 4.1.3-1	Summary of Mineral Resources Within 0.25 Mile of the MIDSHIP Project.....	4-5
Table 4.1.4-1	Potential Seismic Hazard for the MIDSHIP Project	4-6
Table 4.1.4-2	Faults Crossed by the MIDSHIP Project.....	4-11
Table 4.2.1-1	Summary of Soil Characteristics Affected by the MIDSHIP Project	4-16
Table 4.3.1-1	Major and Minor Aquifers Crossed by the MIDSHIP Project.....	4-24
Table 4.3.1-2	Water Wells near the MIDSHIP Project	4-27
Table 4.3.2-1	Watersheds Crossed by Pipeline Facilities Associated with the MIDSHIP Project.....	4-31
Table 4.3.2-2	Summary of Waterbodies Crossed by the MIDSHIP Project	4-32
Table 4.3.2-3	Impaired Surface Waters Crossed by Pipeline Facilities for the MIDSHIP Project.....	4-35
Table 4.3.2-4	Waterbody Crossings That May Require Blasting During Construction of the MIDSHIP Project	4-38
Table 4.3.2-5	Hydrostatic Test Water Requirements for the MIDSHIP Project	4-40
Table 4.3.2-6	Horizontal Directional Drill Water Requirements for the MIDSHIP Project	4-41
Table 4.3.2-7	Dust Control Water Requirements for the MIDSHIP Project	4-42
Table 4.3.2-8	Justification for Additional Temporary Workspaces Within 50 Feet of Waterbodies for the MIDSHIP Project.....	4-49
Table 4.4.1-1	Wetlands Crossed by the MIDSHIP Project	4-52
Table 4.4.4-1	Wetland Acreages Affected by the Construction and Operation of the MIDSHIP Project	4-54
Table 4.4.5-1	Justification for Additional Temporary Workspace Within 50 Feet of Wetlands for the MIDSHIP Project.....	4-57
Table 4.5.4-1	Acres of Vegetation Potentially Affected by the MIDSHIP Project	4-62
Table 4.6.1-1	Representative Species Within Vegetation Communities for the MIDSHIP Project.....	4-66
Table 4.7.1-1	Federally Listed Species Potentially Occurring Within the Vicinity of the MIDSHIP Project	4-75
Table 4.7.2-1	Birds of Conservation Concern and Priority Species in the Vicinity of the MIDSHIP Project Area	4-86
Table 4.8.1-1	Land Use Types Affected by the MIDSHIP Project	4-91
Table 4.8.3-1	Structures Within 50 Feet of the MIDSHIP Project Construction Right-of-Way ...	4-97
Table 4.8.4-1	Pecan Groves Crossed by the MIDSHIP Project	4-101
Table 4.8.5-1	Commissioners of the Land Office Lands Crossed by the MIDSHIP Project	4-104

LIST OF TABLES (cont'd)

<u>Table No.</u>	<u>Title</u>	<u>Page</u>
Table 4.9.2-1	Existing Economic Conditions in the MIDSHIP Project Area.....	4-110
Table 4.9.2-2	Summary of Construction and Operational Workforce and Estimated Payroll for the MIDSHIP Project.....	4-112
Table 4.9.3-1	Available Housing in the MIDSHIP Project Study Area	4-113
Table 4.9.4-1	Public Services Available in the MIDSHIP Project Study Area	4-114
Table 4.9.5-1	Summary of Traffic Volume Impacts Associated with MIDSHIP Project Compressor and Booster Station Construction.....	4-116
Table 4.9.8-1	Race and Income Data for the MIDSHIP Project Environmental Justice Study Area.....	4-123
Table 4.11.1-1	Construction Emissions for the MIDSHIP Project.....	4-138
Table 4.11.1-2	Summary of Pollutant Potential Emissions from the Calumet Compressor Station.....	4-140
Table 4.11.1-3	Summary of Pollutant Potential Emissions from the Tatums Compressor Station.....	4-141
Table 4.11.1-4	Summary of Pollutant Potential Emissions from the Bennington Compressor Station.....	4-142
Table 4.11.1-5	Summary of Pollutant Potential Emissions from the Sholem Booster Station.....	4-143
Table 4.11.1-6	Summary of Pollutant Potential Emissions from Meter Stations	4-144
Table 4.11.1-7	Summary of Emissions from MIDSHIP Project Pipeline Operation	4-144
Table 4.11.1-8	Air Quality Modeling Analysis for Compressor Stations and Booster Station	4-145
Table 4.11.2-1	Noise Levels of Major Equipment Associated with Pipeline Construction	4-148
Table 4.11.2-2	Compressor Stations and Booster Station Construction Noise Estimates	4-149
Table 4.11.2-3	Noise Assessments for Horizontal Directional Drill Entry and Exit Sites Associated with the MIDSHIP Project.....	4-150
Table 4.11.2-4	Noise Assessment for the Calumet Compressor Station	4-152
Table 4.11.2-5	Noise Assessment for the Tatums Compressor Station.....	4-153
Table 4.11.2-6	Noise Assessment for the Bennington Compressor Station.....	4-154
Table 4.11.2-7	Noise Assessment for the Sholem Booster Station	4-155
Table 4.11.2-8	Noise Assessment for Meter Stations.....	4-157
Table 4.12.1-1	Area Classifications Crossed by the MIDSHIP Project	4-160
Table 4.12.1-2	High Consequence Areas Crossed by the MIDSHIP Project.....	4-162
Table 4.12.2-1	Natural Gas Transmission Pipeline Significant Incidents by Cause (1995 to 2014)	4-165
Table 4.12.2-2	Significant Incidents Resulting from Outside Forces, Excavation, and Natural Forces by Cause (1995 to 2014).....	4-166
Table 4.12.3-1	Annual Injuries and Fatalities – Natural Gas Transmission Pipelines (2010 to 2014)	4-167
Table 4.12.3-2	Nationwide Accidental Deaths	4-167
Table 4.13-1	Resource-Specific Geographic Regions for Determining Cumulative Impacts for the MIDSHIP Project.....	4-170
Table 4.13.1-1	Number and Status of Oil and Gas Wells Within Counties Crossed by the MIDSHIP Project	4-173
Table 4.13.2-1	Potential Annual Emission Rates Associated with the Ratliff City Compressor Station.....	4-188

LIST OF FIGURES

<u>Figure No.</u>	<u>Title</u>	<u>Page</u>
Figure 2.1-1	Project Location Map – MIDSHIP Project	2-2
Figure 2.3.1-1	Typical Pipeline Construction Sequence.....	2-11
Figure 3.2-1	Existing System Alternatives Overview Map	3-4
Figure 4.1.4-1	Recent Earthquakes in the Project Area	4-7
Figure 4.1.4-2	2017 USGS Seismic Hazard Map	4-8
Figure 4.3.1-1	Aquifers and Wellhead Protection Areas	4-25

LIST OF APPENDICES

VOLUME II

Appendix A	Distribution List for the Draft Environmental Impact Statement
Appendix B	Project Overview Maps and Typical Construction Drawings
Appendix C	Summary of Existing Rights-of-Way Collocated With the Midcontinent Supply Header Interstate Pipeline Project Pipelines
Appendix D	Additional Temporary Workspace Associated with Construction of the Midcontinent Supply Header Interstate Pipeline Project
Appendix E	Temporary and Permanent Access Roads Associated with the Midcontinent Supply Header Interstate Pipeline Project
Appendix F	Horizontal Directional Drill Procedures and Mud Monitoring Plan
Appendix G	Road and Railroad Crossings Associated with the Midcontinent Supply Header Interstate Pipeline Project
Appendix H	Karst Mitigation Plan
Appendix I	Blasting Plan
Appendix J	Waterbodies Crossed by Midcontinent Supply Header Interstate Pipeline Project Pipeline Facilities
Appendix K	Noise Figures
Appendix L	Past, Present, and Reasonably Foreseeable Future Projects with Potential for Cumulative Impacts when Combined with the MIDSHIP Project
Appendix M	References
Appendix N	List of Preparers
Appendix O	Responses to Comments on the Draft Environmental Impact Statement
Appendix P	Index

TECHNICAL ACRONYMS AND ABBREVIATIONS

°F	degrees Fahrenheit
ABB	American burying beetle
AC	alternating current
ACHP	Advisory Council on Historic Preservation
ACRES	Assessment, Cleanup, and Redevelopment Exchange System
APE	area of potential effect
AQCR	air quality control region
ARPA	Archeological Resources Protection Act
ATWS	additional temporary workspace
BA	Biological Assessment
BCC	Birds of Conservation Concern
BCR	Bird Conservation Regions
BIA	Bureau of Indian Affairs
BO	Biological Opinion
CAA	Clean Air Act
CEQ	Council on Environmental Quality
Certificate	Certificate of Public Convenience and Necessity
CFR	Code of Federal Regulations
CH ₄	methane
Cheniere Midstream	Cheniere Midstream Holdings, Inc.
CLO	Commissioners of the Land Office
CO	carbon monoxide
CO ₂	carbon dioxide
CO ₂ e	carbon dioxide equivalents
COE	U.S. Army Corps of Engineers
Commission	Federal Energy Regulatory Commission
CREP	Conservation Reserve Enhancement Program
CRP	Conservation Reserve Program
CWA	Clean Water Act
dB	decibels
dba	decibel levels are corrected using the A-weighted scale
DOI	U.S. Department of the Interior
DOT	U.S. Department of Transportation
EI	environmental inspectors
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act of 1973
FDCP	Fugitive Dust Control Plan
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FSA	Farm Service Agency
FWS	U.S. Fish and Wildlife Service
g	gravitational acceleration
GHG	greenhouse gas
GIS	Geographic Information System
gpm	gallons per minute
GWP	global warming potential
HAP	hazardous air pollutants
HCA	high consequence area

TECHNICAL ACRONYMS AND ABBREVIATIONS (cont'd)

HDD	horizontal directional drill
HDD Plan	Horizontal Directional Drill Procedures and Mud Monitoring Plan
hp	horsepower
HUC	Hydrologic Unit Code
INGAA	Interstate Natural Gas Association of America Foundation
L_{dn}	day-night sound level
L_{eq}	equivalent sound level
MAOP	maximum allowable operating pressure
MBTA	Migratory Bird Treaty Act
Memorandum	Memorandum of Understanding on Natural Gas Transportation Facilities
Midship Pipeline	Midship Pipeline Company, LLC
MIDSHIP Project	Midcontinent Supply Header Interstate Pipeline Project
MLV	mainline valves
MMcf/d	million standard cubic feet per day
MMDth/d	million dekatherms per day
MOU	memorandum of understanding
MP	milepost
MSA	metropolitan statistical area
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act of 1969
NESHAP	National Emission Standards for Hazardous Air Pollutants
NGA	Natural Gas Act of 1938
NGPL	Natural Gas Pipeline Company of America
NHPA	National Historic Preservation Act
NOAA	National Oceanic and Atmospheric Administration
NOAA Fisheries	NOAA National Marine Fisheries Service
NOI	Notice of Intent to Prepare an Environmental Impact Statement for the Planned Midcontinent Supply Header Interstate Pipeline Project, Request for Comments on Environmental Issues, and Notice of Public Scoping Sessions
NOx	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NRI	Nationwide Rivers Inventory
NSA	noise-sensitive area
NSPS	New Source Performance Standards
NSR	New Source Review
NWI	National Wetlands Inventory
NWR	National Wildlife Refuge
OAC	Oklahoma Administrative Code
OAS	Oklahoma Archaeological Survey
OCC	Oklahoma Corporation Commission
ODAFF	Oklahoma Department of Agriculture Food and Forestry
ODEQ	Oklahoma Department of Environmental Quality

TECHNICAL ACRONYMS AND ABBREVIATIONS (cont'd)

ODOT	Oklahoma Department of Transportation
ODWC	Oklahoma Department of Wildlife Conservation
OEP	Office of Energy Projects
OGCD	Oil and Gas Conservation Division
OGS	Oklahoma Geological Survey
ONHI	Oklahoma Natural Heritage Inventory
OWRB	Oklahoma Water Resources Board
pCi/L	picocuries per liter
PEM	palustrine emergent
PFO	palustrine forested
PGA	peak ground acceleration
PHMSA	Pipeline and Hazardous Materials Safety Administration
Plan	FERC's Upland Erosion Control, Revegetation, and Maintenance Plan
PM _{2.5}	inhalable particulate matter with an aerodynamic diameter less than or equal 2.5 microns
PM ₁₀	inhalable particulate matter with an aerodynamic diameter less than or equal 10 microns
Procedures	Wetland and Waterbody Construction and Mitigation Procedures
PSD	Prevention of Significant Deterioration
psig	pounds per square inch gauge
PSS	palustrine scrub-shrub
PTE	potential-to-emit
RV	recreational vehicle
SCC	social cost of carbon
SCOOP	South Central Oklahoma Oil Province
SHPO	State Historic Preservation Office
SO ₂	sulfur dioxide
SPRP	Spill Prevention and Response Procedures
SSA	sole source aquifer
SSURGO	Soil Survey Geographic database
STACK	Sooner Trend Anadarko Basin Canadian and Kingfisher
Supplemental NOI	Supplemental Notice of Intent to Prepare an Environmental Impact Statement for the Planned Midcontinent Supply Header Interstate Pipeline Project and Request for Comments on Environmental Issues Related to New Pipeline Lateral and Booster Station
tpy	tons per year
UIC	underground injection control
Unanticipated Contamination Plan	Midship Procedure for Addressing Discovery of Unanticipated Contamination during Construction
USC	United States Code
USDA	U.S. Department of Agriculture
USGCRP	U.S. Global Change Research Program
USGS	U.S. Geological Survey
VOC	volatile organic compound
WEG	wind erodibility group
WMA	Wildlife Management Area

EXECUTIVE SUMMARY

INTRODUCTION

On May 31, 2017, Midship Pipeline Company, LLC (Midship Pipeline) filed an application with the Federal Energy Regulatory Commission (FERC or Commission) under section 7(c) of the Natural Gas Act of 1938 (NGA) and part 157 of the Commission's regulations. The application was assigned Docket No. CP17-458-000 and a Notice of Application was issued on June 14, 2017 and noticed in the Federal Register on June 21, 2017. Midship Pipeline is seeking a Certificate of Public Convenience and Necessity (Certificate) from FERC to construct, own, and operate a new 234.1-mile-long natural gas pipeline system and associated facilities in Oklahoma. Midship Pipeline's proposal is referred to as the Midcontinent Supply Header Interstate Pipeline Project (MIDSHIP Project).

The purpose of this environmental impact statement (EIS) is to inform FERC decision-makers, the public, and the permitting agencies about the potential adverse and beneficial environmental impacts of the project and its alternatives, and recommend mitigation measures that would reduce adverse impacts to the extent practicable. We¹ prepared this EIS to assess the environmental impacts associated with construction and operation of the project as required under the National Environmental Policy Act of 1969, as amended. Our analysis was based on information provided by Midship Pipeline and further developed from data requests; field investigations; scoping; literature research; contacts with or comments from federal, state, and local agencies; and comments from individual members of the public.

FERC is the lead agency for the preparation of the EIS. The U.S. Environmental Protection Agency (EPA) is participating in the National Environmental Policy Act review as a cooperating agency.²

PROPOSED ACTION

The MIDSHIP Project, would involve the construction and operation of approximately:

- 199.7 miles of new 36-inch-diameter natural gas pipeline in Kingfisher, Canadian, Grady, Garvin, Stephens, Carter, Johnston, and Bryan Counties (the Mainline);
- 20.5 miles of new 30-inch-diameter pipeline lateral in Kingfisher County (the Chisholm Lateral);
- 13.8 miles of new 16-inch-diameter pipeline lateral in Stephens, Carter, and Garvin Counties (the Velma Lateral); and
- 0.1 mile of new 24-inch-diameter tie-in piping in Canadian County (Tie-in Piping).³

In addition to the pipeline facilities, Midship Pipeline proposes to construct and operate the following aboveground facilities:

- three new compressor stations and one new booster station (118,400 total combined horsepower) in Canadian, Garvin, Bryan, and Stephens Counties;

¹ "We," "us," and "our" refer to the environmental staff of FERC's Office of Energy Projects.

² A cooperating agency is an agency that has jurisdiction over all or part of a project area and must make a decision on a project, and/or an agency that provides special expertise with regard to environmental or other resources.

³ Includes associated equipment and facilities (e.g., cathodic protection systems, tie-in piping/tap lines).

- eight new receipt meters, two new receipt taps, and four new delivery meters in Bryan, Canadian, Carter, Garvin, Grady, Kingfisher, and Stephens Counties; and
- appurtenant facilities.

Subject to the receipt of the FERC authorization and all other applicable permits, authorizations, and approvals, Midship Pipeline anticipates starting construction as soon as possible, with an estimated in-service date in late summer of 2019.

According to Midship Pipeline, the purpose of the project is to provide an additional 1,440 million standard cubic feet per day of year-round firm transportation capacity from the South Central Oklahoma Oil Province (SCOOP) and the Sooner Trend Anadarko Basin Canadian and Kingfisher (STACK) plays in the Anadarko Basin in Oklahoma to existing natural gas pipelines near Bennington, Oklahoma for transport to growing Gulf Coast and Southeast markets.

PUBLIC INVOLVEMENT

On November 9, 2016, FERC began its pre-filing review of the MIDSHIP Project and established pre-filing Docket No. PF17-3-000 to place information related to the project into the public record. The EPA agreed to conduct its environmental review of the project in conjunction with the Commission's environmental review process.

On January 27, 2017, the Commission issued a *Notice of Intent to Prepare an Environmental Impact Statement for the Planned Midcontinent Supply Header Interstate Pipeline Project, Request for Comments on Environmental Issues, and Notice of Public Scoping Sessions* (NOI). The NOI was published in the Federal Register on February 2, 2017, and mailed to over 1,100 interested parties on the environmental mailing list (including federal, state, and local government representatives and agencies; elected officials; environmental and public interest groups; Native American tribes; affected property owners; other interested parties; and local libraries and newspapers). Publication of the notice established a 30-day public comment period for the submission of comments, concerns, and issues related to the environmental aspects of the project.

Between February 13 and 16, 2017, FERC conducted public scoping sessions in Durant, Ardmore, Elmore City, and El Reno, Oklahoma to provide an opportunity for the public to learn more about the project and to participate in our analysis by providing oral comments on environmental issues to be included in the EIS. Each meeting was documented by a court reporter.

On March 22, 2017, the Commission issued a *Supplemental Notice of Intent to Prepare an Environmental Impact Statement for the Planned Midcontinent Supply Header Interstate Pipeline Project and Request for Comments on Environmental Issues Related to New Pipeline Lateral and Booster Station* (Supplemental NOI) to seek comments on additional facilities identified by Midship Pipeline as part of the project, specifically the Velma Lateral and Sholem Booster Station. The Supplemental NOI was published in the Federal Register on March 28, 2017, and was mailed to over 1,260 interested parties on the environmental mailing list. The letter briefly described the new facilities and invited newly affected landowners to participate in the environmental review process by opening a special 30-day limited scoping period.

On February 9, 2018, we issued a *Notice of Availability of the Draft Environmental Impact Statement for the Proposed Midcontinent Supply Header Interstate Pipeline Project*. This notice, which was published in the Federal Register, listed the dates and locations of public comment sessions and established a closing date of April 2, 2018, for receiving comments on the draft EIS. Copies of the draft

EIS were mailed to over 1,400 stakeholders. The EPA noticed receipt of the draft EIS in the Federal Register on February 16, 2018.

We held four public comment sessions in the project area to receive comments on the draft EIS. The comment sessions were held in Durant, Ardmore, Elmore City, and El Reno between April 12 and 15, 2018. The comment sessions provided stakeholders an opportunity to present oral comments on the analysis of environmental impacts described in the draft EIS. Four people commented during the public scoping sessions (two in Durant, one in Elmore City, and one in El Reno). Each comment session was documented by a court reporter.

Substantive environmental issues identified through this public review process are addressed in this EIS. The transcripts of the public scoping sessions and all written comments are part of FERC's public record for the project and are available for viewing using the appropriate docket number.⁴

ENVIRONMENTAL IMPACTS AND MITIGATION

We evaluated the potential impacts of construction and operation of the project on geology; soils; water resources; wetlands; vegetation; wildlife and aquatic resources; threatened, endangered, and special status species; land use, recreation, and visual resources; socioeconomics; cultural resources; air quality and noise; reliability and safety; and cumulative impacts. In section 3 of this EIS, we summarized the evaluation of alternatives to the project, including the no-action alternative, system alternatives, pipeline route alternatives, and aboveground facility alternatives. Where necessary, we are recommending additional mitigation measures to minimize or avoid these impacts. Sections 5.1 and 5.2 of the EIS contain our conclusions and a compilation of our recommended mitigation measures, respectively.

Construction of the MIDSHIP Project would affect 3,340.7 acres of land, of which 91 percent would be for the pipeline facilities, 4 percent for aboveground facilities, 3 percent for access roads, and 2 percent for contractor yards. Permanent operations would require 1,474.4 acres of land, of which 94 percent would be for the pipeline rights-of-way, 6 percent for aboveground facilities, and less than 1 percent for permanent access roads. Midship Pipeline would restore the remaining 1,866.3 acres of land disturbed during construction and allow it to revert to its former use.

Important issues identified as a result of our analyses, scoping comments, and agency consultations include impacts on geology and seismic hazards; groundwater, surface water, water use, and wetlands; vegetation, wildlife, and aquatic species; special status species; land use, recreation, and visual resources; cultural resources; air quality and noise; safety and reliability; and the cumulative impacts of projects in the vicinity of the MIDSHIP Project.

Geology and Seismic Hazards

Blasting and rock removal may be required as part of construction activities in areas of shallow bedrock. About 61.0 miles (31 percent) of the Mainline, 17.2 miles (84 percent) of the Chisholm Lateral, and 6.3 miles (46 percent) of the Velma Lateral may encounter bedrock less than 5 feet below the ground surface. Midship Pipeline would conduct blasting activities in accordance with applicable federal, state, and local regulations. In addition, impacts on geologic resources and nearby residences and facilities would be avoided or adequately minimized by the measures and notifications in Midship Pipeline's project-specific *Blasting Plan*.

⁴ Transcripts of the public scoping sessions and written comments are available for viewing through eLibrary on the FERC internet website at <http://ferc.gov>.

The MIDSHIP Project is within 0.25 mile of 1 active mine and 587 active oil and gas wells. None of these oil and gas wells are within the proposed workspace for the project; however, 53 oil and gas wells are within 150 feet of the project workspace. Midship Pipeline would continue to coordinate with landowners and well operators to identify and avoid oil and gas wells.

The MIDSHIP Project would not cross any active faults. However, we received comments expressing concern about pipeline safety due to the recent trend of increased frequency and magnitude of induced earthquakes. According to the *Susceptibility of the Midship Pipeline to Damage from Seismic Events in Oklahoma* report (Seismic Report) prepared for the project, the potential for soil liquefaction in the project area is very low and models indicate that stresses on the pipeline associated with earthquake ground wave propagation would be within acceptable limits. Modern gas transmission pipelines have been shown to perform well in seismically active areas and, based on Pipeline and Hazardous Materials Safety Administration (PHMSA) pipeline incident data, the increased frequency and magnitude of earthquakes has not caused an increase of pipeline failures in Oklahoma.

With Midship Pipeline's proposed implementation of the Commission's *Upland Erosion Control, Revegetation, and Maintenance Plan* (Plan) and *Wetland and Waterbody Construction and Mitigation Procedures* (Procedures); Midship Pipeline's *Karst Mitigation Plan, Blasting Plan*, and other proposed mitigation measures; and the results of the Seismic Report; we conclude that impacts of the MIDSHIP Project on geologic resources would be adequately avoided or minimized.

Groundwater, Surface Water, Water Use, and Wetlands

Groundwater resources in the project area include five principal aquifer systems. Between mileposts (MP) 147.2 and 147.6, the Mainline would cross the Arbuckle-Simpson aquifer, which is an EPA-designated Sole Source Aquifer. We received scoping comments related to potential impacts of leaks and spills on vulnerable aquifers. The North Canadian, Canadian, and Washita River alluvial aquifers are classified as having very high vulnerability. To minimize the potential for groundwater impacts associated with an inadvertent spill of hazardous materials, Midship Pipeline would implement the measures in its *Spill Prevention and Response Procedures* (SPRP), which includes spill response measures, emergency notification procedures, and spill containment measures to recover spilled materials and facilitate cleanup operations.

Nineteen private water wells and two springs were identified within 150 feet of the project workspace, none of which are within the proposed workspace. Midship Pipeline has agreed to perform pre- and post-construction well and spring yield and water quality monitoring for private wells and springs within 150 feet of the construction workspace, subject to landowner approval. On March 22, 2018, the U.S. Department of the Interior's Office of Environmental Policy and Compliance recommended in its comments on the draft EIS that Midship Pipeline develop a well water quality sampling plan and implement recommended groundwater sampling parameters. We agree that a spring and water well sampling plan should be developed and are recommending Midship Pipeline file a plan prior to construction. In the event that a construction-related activity affects the yield or water quality of a well or spring, Midship Pipeline would work with the landowner to repair or restore the well or spring and provide an alternate water source until repairs are made, or provide compensation to the owner for damages. Midship Pipeline would not store hazardous materials, refuel equipment or vehicles, or park equipment or vehicles overnight within 100 feet of wells and springs.

The project would not significantly affect groundwater resources because the majority of construction would involve shallow, temporary, and localized excavation. These potential impacts would be avoided or further minimized by the use of the construction techniques and mitigation described in the Plan and Procedures and Midship Pipeline's *Karst Mitigation Plan* and *Blasting Plan*. In addition,

Midship Pipeline would prevent or adequately minimize inadvertent spills and leaks of hazardous materials into groundwater resources during construction and operation by adhering to its SPRP. We conclude that potential impacts on groundwater resources would be avoided, minimized, or mitigated.

The pipeline facilities and construction workspace would cross 407 waterbodies (58 perennial waterbodies, 121 intermittent waterbodies, 213 ephemeral waterbodies, and 15 ponds). Of these, 53 waterbodies are within the workspace, but are not crossed by the proposed pipeline, and 15 are associated with access roads (5 of which are also crossed by the proposed pipeline). Midship Pipeline proposes to install the pipeline across 327 waterbodies via the open-cut crossing method, 43 waterbodies via the dry crossing method, and 17 waterbodies via the horizontal directional drill (HDD) method. Dry crossing methods (flume pipe or dam-and-pump) may be used at other waterbody crossings if field conditions allow at the time of construction.

Three of the five major waterbody crossings (greater than 100 feet wide) would be crossed using the HDD method. Midship Pipeline is proposing to cross the remaining two (an unnamed pond and an unnamed tributary to Caddo Creek) using the open-cut crossing method. Midship Pipeline has committed to restoring the pond crossing to preconstruction conditions and is currently negotiating an easement with the landowner; therefore, we find the proposed crossing method acceptable. To reduce the potential environmental impacts that would be associated with the open-cut crossing of the unnamed tributary to Caddo Creek, we are recommending that Midship Pipeline file a feasibility assessment for shifting the pipeline route to minimize the crossing length or conducting the crossing via an alternative crossing method.

During an HDD, Midship Pipeline would follow its *Horizontal Directional Drill Procedures and Mud Monitoring Plan* (HDD Plan). The HDD Plan includes general procedures for the containment and cleanup of drilling mud, should a release occur during HDD operations.

Midship Pipeline would conduct pipeline construction activities in accordance with the Plan and Procedures, as well as Midship Pipeline's SPRP, HDD Plan, and *Blasting Plan*, where appropriate. With these protective measures in place, and our additional recommendation, we conclude that construction and operation of the project would not result in significant impacts on surface water resources.

Midship Pipeline is proposing to use both surface water and municipal water sources for hydrostatic testing, dust control, and HDD operations. Midship Pipeline would require about 59 million gallons of water for hydrostatic testing of the pipelines and new aboveground facilities and about 74 million gallons of water for dust control activities. During HDD operations, an additional 1.6 million gallons of water would be required to create the drilling mud and 1 million gallons of water would be required to hydrostatically test all of the HDD segments. We are recommending that Midship Pipeline file an updated HDD Plan that confirms it would test all non-municipal water sources for contamination prior to being used for drilling mud, and that it would conduct laboratory sampling of drilling fluid for inorganic and organic environmental contaminants prior to reuse or disposal.

Midship Pipeline would minimize impacts associated with the withdrawal and discharge of water by implementing the mitigation measures outlined in the Procedures, including screening the intakes to prevent entrainment of fish and other aquatic organisms and maintaining adequate flow rates for the protection of downstream aquatic resources. In addition, Midship Pipeline would obtain appropriate discharge permits prior to conducting hydrostatic testing. With implementation of these measures and our recommendation, we conclude that the impacts associated with project-related withdrawal and discharge of water would be effectively minimized.

Construction of the pipeline facilities would affect a total of 3.5 acres of wetlands, including 0.1 acre of forested wetlands, 2.7 acres of emergent wetlands, and 0.6 acre of scrub-shrub wetlands. Construction or operation of the aboveground facilities, contractor yards, or access roads would not affect any wetlands. The project would not result in any permanent loss of wetlands.

In emergent wetlands, the impact of construction would be relatively brief because the emergent vegetation would regenerate quickly, typically within 1 to 3 years. In scrub-shrub and forested wetlands, Midship Pipeline would maintain a 10-foot-wide corridor centered over the pipeline in an herbaceous state and would selectively cut trees within 15 feet of the pipeline centerline. As a result, 0.1 acre of forested wetlands and 0.1 acre of scrub-shrub wetlands would be permanently converted to non-forested wetlands during operation of the project. The remainder of the forested and scrub-shrub vegetation would be allowed to return to preconstruction conditions and would not be affected during operation. Midship Pipeline is consulting with the U.S. Army Corps of Engineers and would develop a *Compensatory Mitigation Plan*, if required, to offset impacts on wetlands that would be converted to emergent or scrub-shrub.

While minor adverse and long-term effects on wetlands would occur, with adherence to the Procedures, we conclude that construction and operation of the project would result in minor effects on wetlands that would be appropriately mitigated and reduced to less than significant levels. In addition, Midship Pipeline would further offset impacts on wetlands through its U.S. Army Corps of Engineers-approved *Compensatory Mitigation Plan*, if required.

Vegetation, Wildlife, and Aquatic Species

Construction of the project, including the construction right-of-way, extra workspace, aboveground facilities, contractor yards, and access roads would affect 3,198.8 acres of vegetated lands. This total includes 462.4 acres of upland forest and 0.2 acre of forested wetland. During operations, Midship Pipeline would mow a 50-foot-wide permanent right-of-way no more than once every 3 years; however, a 10-foot-wide swath may be mowed more frequently to facilitate routine patrols and emergency access to the pipeline centerline. Operation of the project would result in 1,438.5 acres of impact on vegetated lands, including 192.6 acres of upland forest and 0.1 acre of forested wetlands.

The greatest impact on vegetation would be on forested areas because of the time required for tree regrowth back to preconstruction conditions. Construction in forestlands would remove the tree canopy over the width of the construction right-of-way, which would change the structure and environment of the underlying and adjacent areas. Forested uplands within the maintained right-of-way would be permanently converted to an herbaceous cover type.

The proposed project crosses several large forested areas, which are primarily within Garvin, Stephens, Carter, and Johnston Counties. The pipeline routes would be collocated in many of these areas, thus reducing overall impacts on adjacent forested communities and forest fragmentation. However, several densely forested tracts near the border of Garvin and Carter Counties would be fragmented by construction of the MIDSHIP Project. The creation of edge habitat could increase the risk of invasive species and other impacts on wildlife species. The regrowth of shrubs and trees within the temporary workspaces would reduce the edge effect and provide connectivity between adjacent forested tracts to some extent, but it may take decades before these areas resemble the forest vegetation that was present before construction, resulting in long-term impacts.

Midship Pipeline would implement mitigation measures to reduce the spread of noxious weed species within the project area, including using certified weed-free seed products and mulch materials; cleaning construction machinery, equipment, and vehicles; documenting the presence of existing noxious

weed populations observed during clearing and construction; and monitoring and controlling occurrences of noxious and invasive weed species in locations along the route where infestations were not identified prior to construction.

Based on our review of the potential impacts on vegetation as described above, we conclude that the primary impact from construction and operation of the project would be on forested lands. However, based on the eventual regrowth of prior forested areas outside of the permanent right-of-way, and collocation with existing, maintained rights-of-way through the majority of large forested areas crossed by the proposed pipeline routes, we conclude that impacts on vegetation, including forested areas, would be adequately reduced to less than significant levels. In addition, impacts on forested and non-forested vegetation types, as well as the introduction or spread of noxious weeds or invasive plant species, would be further mitigated through adherence to the measures outlined in the Plan and Procedures, migratory bird provisions, and Midship Pipeline's forthcoming *Compensatory Mitigation Plan* for wetlands.

Construction of the MIDSHIP Project would result in both temporary and permanent impacts on wildlife and wildlife habitat. Direct impacts of construction on wildlife include displacement, stress, and direct mortality of some individuals. The cutting, clearing, and/or removal of existing vegetation within the construction work area could also affect wildlife by reducing suitable cover, nesting, and foraging habitat for some wildlife species. Some of these effects would be temporary, lasting only while construction is occurring, or short term, lasting no more than a few years until the preconstruction habitat and vegetation type would be reestablished. Other impacts would be longer term, such as the re-establishment of forested habitats, which could take several years or decades. Construction of the aboveground facilities would result in the permanent displacement of wildlife due to the conversion of vegetated habitat to non-vegetated and/or impervious cover, and due to the erection of security fencing at the new aboveground facility sites.

Two areas in the vicinity of the project are considered significant wildlife habitats: the Tishomingo National Wildlife Refuge and the Texoma/Washita Arm of the Tishomingo Wildlife Management Area (WMA). Because the MIDSHIP Project would not cross either of these areas, we conclude that no direct impacts would occur.

Based on the presence of suitable adjacent habitat available for use, the temporary nature of pipeline construction, the relatively low amount of habitat converted to developed land, and given the impact avoidance, minimization, and mitigation measures proposed by Midship Pipeline (e.g., Midship Pipeline's implementation of the measures in the Plan and Procedures and its SPRP), we conclude that construction and operation of the project would not result in a significant impact on wildlife resources.

The Mainline would cross Pennington Creek, which is designated as a coolwater fishery; the Canadian River, which contains critical habitat for the Arkansas River shiner and supports populations of the threatened species; and the Blue River, which supports populations of the least darter (a U.S. Fish and Wildlife Service [FWS]-identified fishery of special concern). Midship Pipeline proposes to install the Mainline beneath Pennington Creek, the Canadian River, and the Blue River using the HDD method, thus avoiding direct impacts on these waterbodies and the associated aquatic resources.

Midship Pipeline would minimize the effects of construction on aquatic species by using the HDD method to install the pipeline beneath 17 waterbodies, conducting crossings as close to perpendicular to the axis of the waterbody channel as engineering and routing conditions permit, and installing sedimentation control techniques to minimize and route silt-laden flow to well-vegetated areas or erosion control devices. Midship Pipeline would also implement the measures outlined in the Procedures to minimize impacts on aquatic resources such as restoring stream beds and banks to preconstruction conditions and seeding riparian areas.

Given the impact avoidance, minimization, and mitigation measures proposed by Midship Pipeline, including adherence to multiple resource protection plans, we conclude that the project would result in some temporary effects on aquatic resources, but that these effects would be minimized or adequately mitigated.

Special Status Species

To comply with section 7 of the Endangered Species Act (ESA), we consulted either directly or indirectly (through Midship Pipeline's informal consultation) with the FWS⁵ and state resource agencies regarding the presence of federally listed and federally proposed species and their habitats that are protected under the ESA, as amended, and species that are currently candidates for federal listing under the ESA. No state-listed species occur in the project area. Based on these consultations, we identified seven federally listed species that could be affected by the project, including the black-capped vireo, least tern, piping plover, rufa red knot, whooping crane, Arkansas River shiner, and American burying beetle (ABB). Critical habitat has been designated for one species, the Arkansas River shiner, within the project area.

Potentially suitable breeding habitat for the black-capped vireo within Canadian County is limited to riparian habitat adjacent to the Canadian River (between Mainline MPs 28.0 and 28.7). In addition, this portion of the Canadian River is known to support the Arkansas River shiner and has been designated as critical habitat for this species. To reduce the likelihood that the black-capped vireo is affected by construction activities (i.e., increased noise and activity) associated with the HDD crossing of the river, Midship Pipeline would conduct surveys during the nesting season for active black-capped vireo nests within riparian habitat adjacent to the Canadian River HDD and consult with the FWS to determine appropriate avoidance and mitigation measures. To reduce the likelihood that the Arkansas River shiner would be affected by a potential inadvertent release of drilling fluid during HDD activities, Midship Pipeline would immediately notify FERC and the FWS if an inadvertent release occurs within the Canadian River.

Midship Pipeline conducted species-specific surveys for the ABB during the 2017 survey season, which did not document the presence of the ABB within the project area. Midship Pipeline would conduct surveys for the ABB during the species' 2018 active season. If the 2018 surveys document the presence of ABB in the project area, we are recommending that Midship Pipeline file a project-specific mitigation plan for the ABB and documentation of FWS concurrence with the plan.

For the least tern, piping plover, rufa red knot, and whooping crane, we concluded that impacts on these species would be minimal or adequately minimized because either the species are highly mobile, there is a lack of stopover habitat within the project area, there is ample suitable habitat nearby, or Midship Pipeline has proposed acceptable mitigation measures to reduce potential impacts.

Therefore, we have determined that the project would have *no effect* on the rufa red knot and *is not likely to adversely affect* the black-capped vireo, least tern, piping plover, whooping crane, Arkansas river shiner, and ABB. Similarly, we have determined that the project would not result in the destruction or adverse modification of designated critical habitat for the Arkansas River shiner. However, to ensure compliance with the ESA, we are recommending that construction of the MIDSHIP Project not begin until Midship Pipeline receives written notification that consultation with the FWS has been completed and construction or use of mitigation may begin.

⁵ Because there are no marine or anadromous habitats within the project area, consultation with the National Oceanic and Atmospheric Administration National Marine Fisheries Service is not required for the project.

In accordance with section 7 of the ESA, on February 21, 2018, we requested the FWS consider the draft EIS as the Biological Assessment for the MIDSHIP Project, and also requested FWS concurrence for the seven species with *not likely to adversely affect* determinations. We have not yet received concurrence from the FWS.

A total of 58 priority migratory bird species were identified in the general vicinity of the project area, 24 of which breed in the area. Habitat removal and/or modification during construction and the long-term or permanent conversion of habitats associated with tree clearing and the maintenance of rights-of-way would have indirect effects on migratory birds.

Construction activities could occur during the peak nesting season. To avoid impacts on nesting birds, Midship Pipeline proposes to conduct preconstruction migratory bird nesting surveys within 1 week prior to vegetation clearing. If bird nesting is observed, Midship Pipeline has agreed not to conduct construction activities (including clearing) within 10 feet of the nest until nesting activities have concluded (i.e., chicks have fledged). Operational impacts on migratory birds would be limited to minor maintenance and vegetation clearing outside of the peak nesting season, which would avoid direct impacts on migratory birds, and would not be conducted more frequently than once every 3 years. As such, population-level impacts on migratory birds would be minimized and reduced to less than significant levels. With implementation of these mitigation measures, we conclude that impacts on migratory birds would be temporary and minor, and impacts on migratory bird populations would not be significant.

Midship Pipeline would perform preconstruction surveys for bald and golden eagles in accordance with the project-specific *Migratory Bird Conservation Plan*. If Midship Pipeline was to discover an eagle nest during surveys or project-related activities, it would adhere to the general migratory bird avoidance measures and FWS avoidance measures specific to eagles in the *Oklahoma Ecological Services Field Office Migratory Bird and Eagle Impact Avoidance Measures for Actions Associated with Oil and Gas Projects*. With the implementation of these measures, we have determined that impacts on bald eagles would be temporary and minor.

Midship Pipeline would not begin construction of the MIDSHIP Project until the FERC staff completes consultation with the FWS and has received written notification from FERC that construction or use of mitigation may begin. Further, should a federally listed species be identified during construction of the project that may be affected by that construction, Midship Pipeline would stop construction activities until FERC reinitiates consultation with the FWS, consultation is completed, and Midship Pipeline is granted approval to restart construction in that area. Therefore, we conclude that impacts on special-status species would be adequately avoided or minimized.

Land Use, Recreation, and Visual Resources

Construction of the project would affect a total of 3,340.7 acres of land. During operation, the new permanent pipeline right-of-way, aboveground facilities, and permanent access roads would newly encumber 1,474.4 acres of land.

The land retained as new permanent right-of-way would generally be allowed to revert to its former use, except for forested land. Certain activities, such as the construction of permanent structures or the planting of trees, would be prohibited within the permanent right-of-way. To facilitate pipeline inspection, operation, and maintenance, the entire permanent right-of-way in upland areas would be maintained in an herbaceous/scrub-shrub vegetated state.

Midship Pipeline's proposed construction work area is within 50 feet of 17 structures, none of which are residences. Seven structures are within the proposed construction workspace, six of which Midship Pipeline would move out of the construction right-of-way. One structure along the Velma Lateral would be marked and avoided during construction. Following construction, structures that were removed would be relocated to adjacent areas, restored to their original locations, or taken to an approved disposal site, depending on landowner requests. No structures would be relocated to the permanent right-of-way. Landowners would be compensated for damage to or loss of any intact structures.

Construction of the project would affect a total of about 939.2 acres of agricultural land, of which about 412.9 acres would be retained during operation of the project. Agricultural land in the construction rights-of-way would generally be taken out of production for one growing season. Following construction, all cropland, hay field, and pastureland used for construction of the pipelines would be restored, and prior agricultural uses would be allowed to continue within the permanent right-of-way.

The Mainline would cross seven pecan groves; however, no other known specialty agricultural areas or organic farm operations would be crossed by the MIDSHIP Project. Midship Pipeline has attempted to minimize effects on pecan groves through avoidance, and would continue to work with individual landowners through the easement process to avoid and minimize impacts where these trees are present. Where avoidance would not be possible, Midship Pipeline would compensate landowners for loss of pecan trees removed during construction of the project.

Seven landowners in the vicinity of the proposed Mainline were identified by the Farm Service Agency as having Conservation Reserve Program easements on their land, and marketable title searches and landowner consultations identified several other properties with county conservation easements, quit claim deeds, or other conservation/wetland programs. Because it is possible that additional conservation easements may be identified that are crossed by the MIDSHIP Project, we are recommending that Midship Pipeline file updated information prior to construction regarding properties that would be crossed by the project that are enrolled in Natural Resources Conservation Service, Farm Service Agency, or other conservation programs, including any proposed mitigation measures developed in consultation with the landowner and/or the administering agency.

The MIDSHIP Project pipelines would cross about 18.9 miles of lands managed by the Commissioners of the Land Office as State Resource Management Areas, which are leased for minerals, agriculture, commercial property, special uses, easements for oil and gas pipelines, salt water lines, electrical transmission lines, roads, and conservation. Midship Pipeline would be required to construct across and restore Commissioners of the Land Office lands in accordance with the terms of the easement agreements, which are issued for a term of 20 years. Following construction, most existing land uses, with the exception of forested areas, would be allowed to return to their previous state.

The MIDSHIP Project would cross or be within 0.25 mile of three areas that support recreation or special interests: Historic Route 66 (a scenic highway), the Texoma/Washita Arm of the Tishomingo WMA, and the Nationwide Rivers Inventory-listed Blue River. Midship Pipeline proposes to use the HDD method to cross Historic Route 66 and the Nationwide Rivers Inventory-listed Blue River. Use of the HDD crossing method would avoid direct impacts on these features. The project would pass about 0.2 mile north of the Texoma/Washita Arm of the Tishomingo WMA in an area of mixed open land and forest near Mainline MP 146.0. However, no direct impacts on the WMA would occur during construction or operation based on its distance from the MIDSHIP Project.

About 54 percent of the MIDSHIP Project pipeline facilities would be collocated with or installed adjacent to existing rights-of-way. After construction, all disturbed areas, including forested areas, would be restored in compliance with the Plan and Procedures; federal, state, and local permits; landowner

agreements; and easement requirements. Generally, this would include seeding the restored areas with grasses and other herbaceous vegetation, after which trees would be allowed to regenerate within the temporary workspaces. The visual effects of construction in forested areas would be permanent on the maintained right-of-way where the regrowth of trees would not be allowed, and would be long term, lasting several years or longer, in the temporary workspaces. The greatest potential visual effect would result from the removal of large specimen trees, but the visual effects of removing even smaller trees would still last for several years.

Midship Pipeline has proposed mitigation measures to reduce visual impacts at the new aboveground facilities, including installing perimeter fences; limiting outdoor lighting to the minimum required for security during unmanned nighttime operation; utilizing directional control or downward-facing lighting at the main gates, yards, and building entry and exit doors; and using non-reflective, basic shades of color from a low-contrast palette for compressor station structures. Existing vegetation and/or trees would limit direct views of the Calumet and Tatum Compressor Stations. At the Bennington Compressor Station, Midship Pipeline would plant trees and native grasses to provide visual screening from the nearest residence. No residences are within the viewshed of the booster station. Meter stations are generally visually unobtrusive due to their small size, and most are within areas already dominated by gas production facilities, which would minimize the impact on the overall visual character of the area.

With adherence to Midship Pipeline's proposed impact avoidance, minimization, and mitigation plans, we conclude that overall impacts on land use and visual resources would be adequately minimized.

Cultural Resources

Archaeological surveys conducted for the project identified 36 isolated finds and 58 cultural resources within the area of potential effect (APE). The cultural resources identified during survey include 49 archaeological sites and 9 historic architectural resources. Midship Pipeline's cultural resources consultant recommended the majority of the archaeological sites, the 9 historic architectural resources, and all 36 isolated finds as not eligible for listing in the National Register of Historic Places (NRHP). No impacts on historic properties were identified during a viewshed analysis of historic structures within the indirect APE of the proposed facilities.

The State Historic Preservation Office (SHPO) concurred that the historic archaeological sites, historic architectural resources, and the historic component of three multicomponent sites are not eligible for listing in the NRHP. We concur with the SHPO.

The Oklahoma Archeological Survey (OAS) concurred that 16 pre-contact archaeological sites and the pre-contact component of 3 multicomponent sites are not eligible for listing in the NRHP. The OAS did not concur with the eligibility recommendation of not eligible for one site, which was subsequently avoided by the project. The boundaries of one additional pre-contact site extend outside of the APE; however, the OAS concurred that the portion of the site within the APE lacks research potential and is not eligible. We concur with the OAS.

Both we and Midship Pipeline consulted with 18 federally recognized Native American tribes, as well as several other non-governmental organizations and other potentially interested parties to provide them an opportunity to comment on the proposed project. To ensure that our responsibilities under section 106 of the National Historic Preservation Act are met, we are recommending that Midship Pipeline not begin construction until any additional required surveys are completed, survey reports and treatment plans (if necessary) have been reviewed by the appropriate parties, and we provide written notification to proceed. The studies, the impact avoidance and minimization measures proposed by

Midship Pipeline, and our recommendation would ensure that any adverse effects on cultural resources would be appropriately mitigated.

Air Quality and Noise

Air quality impacts associated with construction of the MIDSHIP Project would include emissions from fossil-fueled vehicles and off-road construction equipment, HDD activities, fugitive dust, and open burning. Construction emissions would be temporary, occurring over the duration of construction activity, and would be emitted at different times and locations along the length of the proposed pipelines and at the aboveground facility sites. Midship Pipeline would operate construction equipment on an as-needed basis and generally during daytime hours. With the mitigation measures proposed by Midship Pipeline, air quality impacts from construction activities would be temporary or short-term, and should not result in a significant impact on local and regional air quality or cause or contribute to a violation of applicable air quality standards.

Operation of the project would result in air emissions from stationary equipment. These operational emissions would occur over the life of the project and would result in long-term impacts on air quality in the project vicinity. To assess the potential air quality impacts associated with operation of these aboveground facilities, Midship Pipeline conducted air quality modeling analyses. The results of the air quality modeling analyses demonstrate that emissions from the Calumet, Tatum, and Bennington Compressor Stations and the Sholem Booster Station, when combined with background air quality concentrations, would be below the National Ambient Air Quality Standards. Because Midship Pipeline would be required to acquire applicable air permits, based on the air quality modeling analysis, and with the mitigation measures proposed by Midship Pipeline, the air quality impacts from operation of the project, although long-term, should not result in a significant impact on local and regional air quality or cause or contribute to a violation of applicable air quality standards.

Construction noise associated with the pipeline would be spread over the length of the pipeline route and would not be concentrated at any one location for an extended period of time, except at the proposed HDD sites. Construction noise associated with the installation of the compressor, booster, and meter stations would be concentrated in the vicinity of each site and would extend for several months, but would vary depending on the specific activities taking place at any given time.

With implementation of Midship Pipeline's proposed noise mitigation measures, the estimated noise attributable to HDD equipment operations would meet our noise criteria (day-night sound level of 55 decibels on the A-weighted scale) at the nearest noise sensitive area (NSA) at all of the HDD locations with the exception of the Pennington Creek HDD. We have reviewed the proposed activities and determined that the proposed mitigation is reasonable and that the noise attributable to the HDD activities would have a moderate but short-term impact on NSAs in the vicinity of the Pennington Creek HDD. In addition, we are recommending that Midship Pipeline file HDD noise assessments for the North Canadian River; Oklahoma, Kansas and Texas Railroad; Blue River; and Rock Creek HDDs to ensure that the final proposed site-specific noise mitigation measures would effectively reduce noise attributable to HDD activities at the nearest NSAs to levels consistent with Midship Pipeline's estimates.

Operation of the project would have a long-term effect on noise levels in proximity to the proposed compressor stations, booster station, and meter stations. The noise associated with some of these facilities is likely to be perceptible at some nearby NSAs; however, Midship Pipeline has proposed mitigation measures at the compressor stations and booster station to minimize continuous noise levels from these facilities at nearby NSAs.

To ensure that the noise levels during operation of the compressor stations and booster station meet the FERC sound criterion, we are recommending that Midship Pipeline file noise surveys at full load conditions and install additional noise controls if the levels are exceeded. Based on the analyses conducted, the proposed mitigation measures, and our recommendations, we conclude that construction and operation of the MIDSHP Project would not result in significant noise impacts on residents and the surrounding environment.

Safety and Reliability

The pipeline and aboveground facilities associated with the project would be designed, constructed, operated, and maintained to meet the U.S. Department of Transportation's (DOT) Minimum Federal Safety Standards in Title 49 of the Code of Federal Regulations part 192 and other applicable federal and state regulations. These regulations include specifications for material selection and qualification; minimum design requirements; and protection of the pipeline from internal, external, and atmospheric corrosion. The DOT rules require regular inspection and maintenance, including repairs as necessary, to ensure the pipeline has adequate strength to transport the natural gas safely.

We conclude that Midship Pipeline's implementation of the above measures would ensure compliance with the DOT's regulations regarding public safety and the integrity of the proposed facilities.

Cumulative Impacts

Recently completed, presently occurring, and reasonably foreseeable future actions in the temporal and geographic scope of the MIDSHP Project were identified for inclusion in our cumulative impact analysis. Impacts from older projects (completed 5 or more years ago) are considered to have been mitigated over time with the disturbed environment having become part of the baseline character of the region. Therefore, projects completed 5 or more years ago are not considered ongoing contributors to cumulative impacts unless they have ongoing operational impacts (e.g., emissions, discharges) with potential to contribute to a cumulative impact on air quality. Actions that contribute to cumulative impacts with pipelines are generally different than actions that contribute to cumulative impacts with aboveground facilities and compressor stations. The majority of the cumulative impacts associated with these projects and with the MIDSHP Project would be minor and temporary during construction. However, some long-term cumulative impacts would occur in forested wetlands and forested uplands with respect to the vegetative communities and associated wildlife habitats. Some long-term cumulative benefits would be realized through new jobs and wages, purchases of goods and materials, and tax revenues.

Operational emissions associated with the aboveground facilities built for the MIDSHP Project would contribute to cumulative impacts on air emissions, and operation of these facilities would contribute to cumulative noise impacts where they are in close proximity to other existing or future facilities. Due to the implementation of specialized construction techniques, the relatively short construction timeframe in any one location, and resource protection and mitigation plans designed to minimize and control environmental impacts for the MIDSHP Project, we conclude that minimal cumulative impacts would occur.

ALTERNATIVES CONSIDERED

As alternatives to the proposed action, we evaluated the no-action alternative, system alternatives, route alternatives, and aboveground facility site alternatives. While the no-action alternative would eliminate the short- and long-term environmental impacts identified in the EIS, the stated objectives of Midship Pipeline's proposal would not be met.

Our analysis of system alternatives included an evaluation of whether existing or proposed natural gas pipeline systems could meet Midship Pipeline's objectives while offering an environmental advantage. We are not aware of any natural gas pipeline systems proposed in the region that would meet the objectives of the MIDSHIP Project. There are several existing natural gas pipeline systems that operate in the vicinity of the project; however, most of these pipeline systems operate at or near capacity in their current configuration. Moreover, none of the existing pipeline systems are configured to receive and deliver natural gas based on the requirements of the project shippers. Additional pipeline looping, compression, and laterals would be required to transport the natural gas, which would likely result in similar environmental impacts. Therefore, none of these pipeline systems would offer a significant environmental advantage and we do not consider them to be preferable alternatives to the MIDSHIP Project.

Midship Pipeline incorporated 28 route variations into the proposed route evaluated in the EIS based on input from its environmental and engineering staff; landowner consultations; and to address constructability issues identified during field surveys. We have reviewed the route variations and agree with Midship Pipeline's conclusions regarding incorporation of these variations into the proposed route.

We did not receive any comments during scoping suggesting that we evaluate any major route alternative and, based on our review of the project, we did not identify any major route alternatives that would offer environmental advantages over the proposed route. However, after receipt of Midship Pipeline's application, we received comments from two landowners requesting that Midship Pipeline modify the pipeline alignment across their properties. We find Midship Pipeline's proposed measures for one of these landowners acceptable and encourage Midship Pipeline to continue its attempts to consult directly with the landowner. In the draft EIS, we recommended that Midship Pipeline assess the feasibility of route adjustments or alternative construction techniques to minimize impacts on a dike on the second landowner's property. Midship Pipeline filed comments on the draft EIS indicating it has incorporated a route variation into the proposed route to avoid crossing the dike as well as documentation that the landowners find the route variation acceptable.

CONCLUSIONS

We determined that construction and operation of the project would result in some adverse environmental impacts, but impacts would be reduced to less-than-significant levels with the implementation of Midship Pipeline's proposed and our recommended mitigation measures. This determination is based on a review of the information provided by Midship Pipeline and further developed from data requests; field investigations; scoping; literature research; alternatives analysis; and contacts with federal, state, and local agencies as well as Indian tribes and individual members of the public.

Although many factors were considered in this determination, the principal reasons are:

- About 127.0 miles (54 percent) of the project pipeline facilities would be within or adjacent to existing rights-of-way, consisting of existing pipeline, electric transmission utility (i.e., powerline), and/or road rights-of-way.
- Midship Pipeline would minimize impacts on natural and cultural resources during construction and operation of the project by implementing the Plan and Procedures, and other project-specific plans (e.g., *Fugitive Dust Control Plan*, *HDD Plan*, *Midship Procedure for Addressing Discovery of Unanticipated Contamination during Construction*, *Migratory Bird Conservation Plan*, *Procedures Guiding the Discovery of*

Unanticipated Cultural Resources and Human Remains, Karst Mitigation Plan, SPRP, Blasting Plan).

- FERC staff would complete the process of complying with section 7 of the ESA prior to construction.
- FERC staff would complete consultation under section 106 of the National Historic Preservation Act and implementing regulations at Title 36 of the Code of Federal Regulations part 800.
- Midship Pipeline would comply with all applicable air and noise regulatory requirements during construction and operation of the project.
- An environmental inspection program would be implemented to ensure compliance with the mitigation measures that become conditions of the FERC authorization.

In addition, we developed project-specific mitigation measures that Midship Pipeline should implement to further reduce the environmental impacts that would otherwise result from construction and operation of the project. We determined that these measures are necessary to reduce adverse impacts associated with the project and, in part, are basing our conclusions on implementation of these measures. Therefore, we are recommending that these mitigation measures be attached as conditions to any authorization issued by the Commission. These recommended mitigation measures are presented in section 5.2 of the EIS.

1.0 INTRODUCTION

On May 31, 2017, Midship Pipeline Company, LLC (Midship Pipeline) filed an application with the Federal Energy Regulatory Commission (FERC or Commission) under section 7(c) of the Natural Gas Act of 1938 (NGA) and part 157 of the Commission's regulations. The application was assigned Docket No. CP17-458-000 and a Notice of Application was issued on June 14, 2017 and noticed in the Federal Register on June 21, 2017. Midship Pipeline is seeking a Certificate of Public Convenience and Necessity (Certificate) from FERC to construct, own, and operate a new 234.1-mile-long natural gas pipeline system and associated facilities in Oklahoma.

Midship Pipeline's proposal, referred to as the Midcontinent Supply Header Interstate Pipeline Project (MIDSHIP Project), would involve the construction and operation of approximately:

- 199.7 miles of new 36-inch-diameter natural gas pipeline in Kingfisher, Canadian, Grady, Garvin, Stephens, Carter, Johnston, and Bryan Counties (the Mainline);
- 20.5 miles of new 30-inch-diameter pipeline lateral in Kingfisher County (the Chisholm Lateral);
- 13.8 miles of new 16-inch-diameter pipeline lateral in Stephens, Carter, and Garvin Counties (the Velma Lateral); and
- 0.1 mile of new 24-inch-diameter tie-in piping in Canadian County (Tie-in Piping).¹

In addition to the pipeline facilities, Midship Pipeline proposes to construct and operate the following aboveground facilities:

- three new compressor stations and one new booster station in Canadian, Garvin, Bryan, and Stephens Counties;
- eight new receipt meters, two new receipt taps, and four new delivery meters in Bryan, Canadian, Carter, Garvin, Grady, Kingfisher, and Stephens Counties; and
- appurtenant facilities.

The proposed facilities are described in detail in section 2.0.

Midship Pipeline seeks approval to begin construction as soon as possible after receiving all necessary federal authorizations, with an estimated in-service date in late summer of 2019. The project schedule is described in more detail in section 2.4.

We² prepared this environmental impact statement (EIS) to assess the environmental impacts associated with construction and operation of the facilities proposed by Midship Pipeline in accordance with the requirements of the National Environmental Policy Act (NEPA) of 1969, as amended. The U.S. Environmental Protection Agency (EPA) is a cooperating agency assisting in the preparation of the EIS. The roles of FERC and the EPA in the review process are described in section 1.2.

¹ Includes associated equipment and facilities (e.g., cathodic protection systems).

² "We," "us," and "our" refer to the environmental staff of the FERC's Office of Energy Projects.

The vertical line in the margin identifies text that is new or modified in the final EIS and differs materially from corresponding text in the draft EIS. Changes were made to address comments from the cooperating agency and other stakeholders on the draft EIS; incorporate modifications to the project proposed by Midship Pipeline after publication of the draft EIS; and incorporate information filed by Midship Pipeline in response to our recommendations in the draft EIS. As a result of the changes, 17 of the recommendations identified in the draft EIS are no longer applicable to the project and do not appear in the final EIS. Additionally, two recommendations identified in the draft EIS have been substantively modified in the final EIS, and four new recommendations have been added in the final EIS.

1.1 PROJECT PURPOSE AND NEED

According to Midship Pipeline, the purpose of the project is to provide an additional 1,440 million standard cubic feet per day (MMcf/d) of year-round firm transportation capacity from the South Central Oklahoma Oil Province (SCOOP) and the Sooner Trend Anadarko Basin Canadian and Kingfisher (STACK) plays in the Anadarko Basin in Oklahoma to existing natural gas pipelines near Bennington, Oklahoma for transport to growing Gulf Coast and Southeast markets.

Following the execution of Transportation Precedent Agreements with Foundation Shippers (Devon Gas Services, LP; Marathon Oil Company; and Gulfport Energy Corporation) and a commitment from Corpus Christi Liquefaction, LLC, an affiliate of Cheniere Energy, Inc., Midship Pipeline held an open season for the project from March 17 to 30, 2017. Midship Pipeline has executed binding precedent agreements³ with the Foundation Shippers and Corpus Christi Liquefaction, LLC, for a minimum of 10 years, for 825 MMcf/d of additional firm transportation capacity.⁴ Table 1.1-1 lists Midship Pipeline's shippers and contracted volumes.

TABLE 1.1-1	
Customers and Transportation Capacity Subscribed to the MIDSHIP Project	
Shipper	Transportation Contract Quantity (MMcf/d)
Devon Gas Services, L.P.	300
Marathon Oil Company	250
Gulfport Energy Corporation	200
Corpus Christi Liquefaction, LLC	75
Total Contracted Volume	825

1.2 PURPOSE AND SCOPE OF THIS STATEMENT

Our principal purposes for preparing this EIS are to:

- identify and assess the potential impacts on the natural and human environment that would result from the implementation of the project;
- describe and evaluate reasonable alternatives to the project that would avoid or substantially lessen adverse effects of the project on the environment while still meeting the project objectives;

³ A precedent agreement is a binding contract under which one or both parties has the ability to terminate the agreement if certain conditions, such as receipt of regulatory approvals, are not met.

⁴ Midship Pipeline is in active discussions with interested producers, processors, and potential foundation shippers for firm transportation from the growing SCOOP/STACK plays, which is forecasted to exceed 5,000 MMcf/d by the year 2020.

- identify and recommend specific mitigation measures, as necessary, to avoid or minimize environmental effects; and
- encourage and facilitate involvement by the public and interested agencies in the environmental review process.

The topics addressed in the EIS include geology; soils; groundwater; surface waters; wetlands; vegetation; wildlife and aquatic resources; special status species; land use, recreation, special interest areas, and visual resources; socioeconomics; cultural resources; air quality and noise; reliability and safety; and cumulative impacts. The EIS describes the affected environment as it currently exists based on available information and the environmental consequences of construction and operation of the MIDSHIP Project. It also compares the project's potential impact to that of various alternatives. Further, the EIS presents our conclusions and recommended mitigation measures.

Our description of the affected environment is based on a combination of data sources including desktop resources such as scientific literature and regulatory agency reports as well as field data collected by Midship Pipeline. As of May 2018, Midship Pipeline had field surveyed about 98 percent of the proposed pipeline route. Completion of field surveys is primarily dependent upon acquisition of survey permission from landowners. If the necessary access cannot be obtained through coordination with landowners and the project is approved by FERC, Midship Pipeline may use the right of eminent domain granted to it under section 7(h) of the NGA to obtain a right-of-way. Therefore, it is possible that access to complete these outstanding surveys (and associated agency permitting) would have to be done after issuance of a Certificate.

1.2.1 Federal Energy Regulatory Commission

FERC is an independent federal regulatory agency responsible for evaluating applications for authorization to construct and operate interstate natural gas pipeline facilities. If the Commission determines that a project is required by the public convenience and necessity, a Certificate would be issued under section 7(c) of the NGA and part 157 of the Commission's regulations. As such, FERC is the lead federal agency for the preparation of this EIS in compliance with the requirements of NEPA, the Council on Environmental Quality (CEQ) regulations for implementing the procedural provisions of NEPA (Title 40 of the Code of Federal Regulations [CFR], Parts 1500-1508), and the FERC's regulations implementing NEPA (18 CFR 380).

This EIS presents our review of potential environmental impacts and reasonable recommendations to avoid or mitigate impacts. This EIS will be used as an element in the Commission's review of the project to determine whether a Certificate would be issued. FERC will also consider non-environmental issues in its review of Midship Pipeline's application. Under section 7(c) of the NGA, the Commission determines whether interstate natural gas transportation facilities are in the public convenience and necessity and, if so, grants a Certificate to construct and operate them. The Commission bases its decisions on technical competence, financing, rates, market demand, gas supply, environmental impact, long-term feasibility, and other issues concerning a proposed project. The assessment of environmental impacts and mitigation are important factors in the overall public interest determination.

1.2.2 U.S. Environmental Protection Agency – Region 6

The EPA is an independent federal agency responsible for protecting human health and safeguarding the natural environment. It sets and enforces national standards under a variety of environmental laws and regulations in consultation with state, tribal, and local governments. In Oklahoma, the EPA has delegated the water quality certification (section 401 of the Clean Water Act

[CWA]) to the Oklahoma Department of Environmental Quality (ODEQ). The EPA has authority to review and veto permits issued by the U.S. Army Corps of Engineers (COE) under section 404 of the CWA.

The EPA has jurisdictional authority to control air pollution under the Clean Air Act (CAA) (Title 42 United States Code [USC] Chapter 85) by developing and enforcing rules and regulations for all entities that emit air pollutants into the air. Under this authority, the EPA has developed regulations for major sources of air pollution and has delegated the authority to implement these regulations to state (i.e., ODEQ) and local agencies. State and local agencies are allowed to develop and implement their own regulations for non-major sources of air pollutants. The EPA also establishes general conformity applicability thresholds that a federal agency can utilize to determine whether a specific action requires a general conformity assessment.

In addition to its permitting responsibilities, the EPA is required under section 309 of the CAA to review and publicly comment on the environmental impacts of major federal actions, including actions that are the subject of draft EISs. The EPA is further responsible for implementing certain procedural provisions of NEPA (e.g., publishing the Notices of Availability of the draft and final EISs in the Federal Register) to establish statutory timeframes for the environmental review process.

1.3 PUBLIC REVIEW AND COMMENT

On October 28, 2016, Cheniere Midstream Holdings, Inc. (Cheniere Midstream), which subsequently changed its name to Midship Pipeline Company, LLC, filed a request with FERC to implement the Commission's pre-filing process for the MIDSHIP Project. At that time, Midship Pipeline was in the preliminary design stage of the project and no formal application had been filed with FERC. The main goals of the pre-filing process are to encourage the early involvement of interested stakeholders, facilitate interagency cooperation, and identify and resolve issues before an application is filed. On November 9, 2016, FERC granted Cheniere Midstream/Midship Pipeline's request and established pre-filing docket number PF17-3-000 to place information related to the project into the public record.

During the pre-filing process, Midship Pipeline held four open houses, eight agency meetings, six tribal meetings, and numerous project briefings between October 2016 and April 2017. The purpose of the open houses, meetings, and briefings was to provide affected landowners, elected and agency officials, tribes, and the general public with information about the project and to give them an opportunity to ask questions and express their concerns. We participated in the open houses to provide information regarding the Commission's environmental review process to interested stakeholders.

In addition, Midship Pipeline established a toll-free project hotline, a project email address, and a website with information about the project. Midship Pipeline also communicated directly with certain landowners where specific issues were raised regarding individual properties.

On January 27, 2017, the Commission issued a *Notice of Intent to Prepare an Environmental Impact Statement for the Planned Midcontinent Supply Header Interstate Pipeline Project, Request for Comments on Environmental Issues, and Notice of Public Scoping Sessions* (NOI). The NOI was published in the Federal Register on February 2, 2017, and mailed to over 1,100 interested parties on the environmental mailing list (federal, state, and local government representatives and agencies; elected officials; environmental and public interest groups; Native American Tribes; affected property owners; other interested parties; and local libraries and newspapers). The NOI briefly described the project and the EIS process, provided a preliminary list of issues we had identified, invited written comments on the environmental issues that should be addressed in the EIS, listed the date and location of four public

scoping sessions to be held in the project area, and established a closing date for receipt of comments of February 27, 2017.

The four public scoping sessions provided an opportunity for agencies, stakeholders, and the general public to learn more about the project and participate in the environmental analysis by commenting on the issues to be addressed in the draft EIS. The scoping sessions were held in Durant, Ardmore, Elmore City, and El Reno between February 13 and 16, 2017. One person commented at the meeting in Durant, two at the meeting in Ardmore, two at the meeting in Elmore City, and one at the meeting in El Reno. Each meeting was documented by a court reporter, and the transcripts were placed into the public record for the project.⁵

On March 22, 2017, the Commission issued a *Supplemental Notice of Intent to Prepare an Environmental Impact Statement for the Planned Midcontinent Supply Header Interstate Pipeline Project and Request for Comments on Environmental Issues Related to New Pipeline Lateral and Booster Station* (Supplemental NOI) to seek comments on additional facilities identified by Midship Pipeline as part of the project, specifically the Velma Lateral and Sholem Booster Station. The Supplemental NOI was published in the Federal Register on March 28, 2017, and was mailed to over 1,260 interested parties on the environmental mailing list. The Supplemental NOI briefly described the newly proposed project facilities and the EIS process, provided a preliminary list of issues we had identified, invited written comments on the environmental issues that should be addressed in the EIS, and established April 21, 2017 as the closing date for receipt of comments. All written scoping comments are part of the public record for the project and are available for viewing through eLibrary on the FERC internet website (<http://ferc.gov>).

In addition, during the pre-filing process, we conducted conference calls on an approximately bi-weekly basis with representatives from Midship Pipeline to discuss the MIDSHP Project's progress and issues. Summaries of the calls were placed in the public record.

Table 1.3-1 lists the environmental issues that were identified during scoping and indicates the section of the EIS in which each issue is addressed. In addition to the comments received at the public scoping meetings, nearly 30 written comments were filed with FERC and placed in the public record for the MIDSHP Project as of January 24, 2018. Two motions to intervene were filed with FERC for the project. Table 1.3-1 also lists comments that were received after the formal scoping period closed, including the relevant environmental comments raised by intervenors in the Commission's proceeding. Additional issues we independently identified are also addressed in the EIS. The distribution list for the draft EIS is included in appendix A.

On February 9, 2018, we issued a *Notice of Availability of the Draft Environmental Impact Statement for the Proposed Midcontinent Supply Header Interstate Pipeline Project*. This notice, which was published in the Federal Register, listed the dates and locations of public comment sessions and established a closing date of April 2, 2018, for receiving comments on the draft EIS.⁶ Copies of the draft EIS were mailed to nearly 1,400 stakeholders. The EPA noticed receipt of the draft EIS in the Federal Register on February 16, 2018.

⁵ Transcripts of the public scoping sessions are available for viewing through eLibrary on the FERC internet website at <http://ferc.gov> (see accession nos. 20170317-4003, 20170317-4004, 20170317-4005, and 20170317-4006).

⁶ The *Notice of Availability of the Draft Environmental Impact Statement for the Proposed Midcontinent Supply Header Interstate Pipeline Project* is available online at <https://www.federalregister.gov/documents/2018/02/16/2018-03203/midship-pipeline-company-llc-notice-of-availability-of-the-draft-environmental-impact-statement-for>

TABLE 1.3-1 Environmental Concerns Identified for the MIDSHIP Project	
Issue/Specific Comment	EIS Section(s) Addressing Comment
General	
Project purpose and need	1.1
Eminent domain	1.2 and 4.8.2
Alternatives	
Existing system alternatives	3.2
Landowner-specific reroute requests	3.3
Geology and Soils	
Geologic hazards (e.g., sinkholes, karst features/limestone)	4.1.4 and 4.1.6
Seismic hazards, including induced seismic events and seismic hazard analysis	4.1.4.1 and 4.1.6
Effects on soil resources, including compaction, topsoil, erosion, runoff, and restoration/revegetation	4.2.1 and 4.2.2
Effects on agricultural land, including topsoil, soil compaction, wind and water erosion, maintaining natural ground contours, and pipeline depth of cover in areas where deep tillage is practiced	4.2.2 and 4.8.4
Water Use and Quality	
Mitigation and prevention of effects on or pollution to waterways and groundwater	4.3.1 and 4.3.2
Stormwater management and erosion control	4.2.2, 4.3.1, and 4.3.2
Effects on scenic rivers and compliance with the Scenic Rivers Act/Scenic Rivers Program requirements	4.3.2.4, 4.8.5, and 4.8.8.1
Effects on the water table, wetlands, groundwater, aquifer recharge areas, and frequently flooded areas; and proposed mitigation measures to minimize or prevent impacts	4.1.4.5, 4.3.1, 4.3.2, and 4.4.4
Effects on water wells and springs, required distance of project from wells and springs, and mitigation measures to minimize effects	4.3.1.7
Effects on floodplains; floodplain development/dam safety permit requirements	4.1.4.5 and 4.3.2.6
Effects on water sources for cattle	4.8.1.2 and 4.8.4
Waterbody/wetland crossing methods, including benefits of horizontal directional drill crossings	2.3.2 and 4.3.2.6
Effects on Henry House Creek, its tributaries, and surrounding wetlands	4.3.2
Effects on Simon and Wildhorse Creeks	4.3.2
Wetland and waterbody survey procedures and mapping	4.3.2.1 and 4.4.1
Concerns regarding existing dams, ponds, and possible effects on stocked fish	4.3.2.6 and 4.6.2
Vegetation, Wildlife, Aquatic Resources, and Special Status Species	
Effects on aquatic resources, wildlife, and their food sources and habitat	4.6
Effects on federally listed species (protected, threatened, endangered, and candidate species) and their habitat	4.7.1
Effects on fish and wildlife conservation areas	4.6.1 and 4.6.2
Flora present in project area	4.5
Effects and mitigation for native bluestem grass field	3.3 and 4.5.2
Land Use	
Effects on land uses, including temporary and permanent acreages, number of landowners affected, proposed restoration, and restricted use	4.8
Effects on future property development	4.8.3.2
Effects on conservation lands	4.8.4 and 4.8.5
Effects on scenic rivers	4.3.2.4, 4.8.5.2, and 4.8.8.1
Effects on agriculture/cropland (loss of production, topsoil protection, deep till farming/pipe depth)	4.2.2 and 4.8.4
Effects on cattle (e.g., loss of grazing area, gates left open, health, safety)	4.8.1.2
Effects on viewshed (specifically visibility of compressor stations)	4.8.6

TABLE 1.3-1 (cont'd)	
Environmental Concerns Identified During the Scoping Process for the MIDSHIP Project	
Issue/Specific Comment	EIS Section Addressing Comment
Socioeconomics	
Effects on property values/how property values are determined	4.9.6
Effects on employment and local tax revenue	4.9.2 and 4.9.7
Effects on traffic and road conditions, including safety, public access, and emergency response	4.9.4 and 4.9.5
Effects on environmental justice communities	4.9.8
Cultural Resources	
Effects on cultural, historic, and prehistoric resources	4.10
Procedures and tribal/agency notification of unanticipated discoveries of cultural resources	4.10.1 and 4.10.4
Consultations with tribal governments	4.10.1
Effects on tribal trust properties	4.10.1
Presence of Native American artifacts and fossils in limestone outcrops	4.1.5 and 4.10.5
Air Quality	
Effects on air quality and pollution	4.11.1.3
Analysis of baseline air quality	4.11.1.1
Quantitative analysis of air emissions including emission sources and specific mitigation measures to be implemented to reduce emissions	4.11.1.3
Compressor station emissions and associated health effects	4.11.1.3
Fugitive dust emissions during construction	4.11.1.2 and 4.11.1.3
Potential for radon exposure	4.11.1.4
Noise	
Noise impacts associated with construction and operation	4.11.2.2
Reliability and Safety	
Safety procedures and health risks associated with potential pipeline leaks, ruptures, and other incidents	4.12.2 and 4.12.3
Health and safety of field staff and cattle	4.12.3
Safety associated with proximity to heavily populated areas	4.12.1
Emergency response procedures, including measures to address potential insufficient number of emergency response personnel in the project area	4.9.4 and 4.12.1
Effects of toxins associated with fracked gas (natural gas extraction)	4.13.2.1
Cumulative Impacts	
Analysis of cumulative impacts associated with multiple other pipeline and infrastructure projects in the area	4.13
Project segmentation/addition of new facilities during pre-filing	4.13

We held four public comment sessions in the project area to receive comments on the draft EIS. The comment sessions were held in Durant, Ardmore, Elmore City, and El Reno between April 12 and 15, 2018. The comment sessions provided stakeholders an opportunity to present oral comments on the analysis of environmental impacts described in the draft EIS. Four people commented during the public comment sessions (two in Durant, one in Elmore City, and one in El Reno). Each comment session was documented by a court reporter, and the transcripts were placed into the public record for the project.⁷ We also received nine written comment letters from federal and state agencies, Native American tribes, companies/organizations, and individuals in response to the draft EIS. The written comment letters are available for viewing through eLibrary on the FERC internet website (www.ferc.gov).

⁷ Transcripts of the public comment sessions are available for viewing through eLibrary on the FERC internet website at <http://www.ferc.gov> (see accession nos. 20180312-4005, 2018-0313-4004, 20180314-4010, and 20180315-4003).

All substantive, relevant, and timely comments on the draft EIS that pertain to environmental issues are addressed in this EIS. As noted previously, substantive changes in the final EIS are indicated by vertical bars that appear in the margins of the text. These changes were made in response to comments received on the draft EIS and as a result of updated information that became available after the issuance of the draft EIS, including information filed by Midship Pipeline. The FERC staff's responses to relevant comments are provided in appendix O.

Copies of this final EIS have been mailed to the agencies, organizations, individuals, and other parties identified in the distribution list provided as appendix A. Additionally, the final EIS has been filed with the EPA for issuance of a formal Notice of Availability in the Federal Register. In accordance with the CEQ's regulations implementing NEPA, no agency decision on the proposed actions may be made until 30 days after the EPA publishes the Notice of Availability in the Federal Register. However, the CEQ regulations provide an exception to this rule when an agency decision is subject to a formal internal appeal process that allows other agencies or the public to make their views known. This is the case at FERC, where any Commission decision on the proposed action would be subject to a 30-day rehearing period. Therefore, the FERC decision may be made and recorded concurrently with the publication of the final EIS.

1.4 NON-JURISDICTIONAL FACILITIES

Under section 7 of the NGA, FERC is required to consider, as part of its decision to authorize interstate natural gas facilities, all factors bearing on the public convenience and necessity. Occasionally, proposed projects have associated facilities that do not come under the jurisdiction of the Commission. These "non-jurisdictional" facilities may be integral to the need for the proposed facilities (e.g., a power plant at the end of a FERC-jurisdictional pipeline), or they may be merely associated as minor, non-integral components of the jurisdictional facilities that would be constructed and operated as a result of certification of the proposed facilities.

The only known non-jurisdictional facilities associated with the proposed MIDSHIP Project are powerlines necessary to supply power to the aboveground facilities (see table 1.4-1). Construction and operation of these facilities would be under the jurisdiction of the Oklahoma Corporation Commission (OCC), which is responsible for licensing and regulating electric power utilities in Oklahoma, and ODEQ, which is the jurisdictional agency for state environmental permitting. These non-jurisdictional facilities are discussed further in our cumulative impacts assessment in section 4.13.

1.5 PERMITS, APPROVALS, AND REGULATORY REVIEWS

As the lead federal agency for the MIDSHIP Project, FERC is required to comply with section 7 of the Endangered Species Act of 1973 (ESA), the Migratory Bird Treaty Act (MBTA), the Rivers and Harbors Act, the CWA, the CAA, and section 106 of the National Historic Preservation Act (NHPA). These and other statutes have been taken into account in the preparation of the EIS.

Table 1.5-1 lists the major federal, state, and local permits, approvals, and consultations identified for the construction and operation of the project. Table 1.5-1 also provides the dates or anticipated dates when Midship Pipeline commenced or anticipates commencing formal permit and consultation procedures. Midship Pipeline would be responsible for obtaining all permits and approvals required to implement the project prior to construction regardless of whether they appear in this table.

TABLE 1.4-1								
Non-jurisdictional Powerlines Associated with the MIDSHIP Project								
MIDSHIP Project Facility	Mile-post ^a	County	Non- jurisdictional Power Company ^b	Power- line Length (feet)	Colloca- tion Length ^c (feet)	Colloca- tion ^d (percent)	Total Acreage Affected ^{e, f}	
							Const.	Oper.
Okarche/MarkWest Meter Station/ Launcher/Chisholm Receiver	0.0/ CH20.4	Kingfisher	Cimarron Electric	54	54	100	0.1	0.1
Canadian Valley Meter Station	10.7	Canadian	Cimarron Electric	54	15	28	0.1	0.1
Cana Meter Station	15.2	Canadian	CKenergy	70	70	100	0.1	0.1
Calumet Compressor Station/ Mainline Valve (MLV) 1100-1	17.6	Canadian	Oklahoma Gas & Electric (OG&E)	1,453	25	2	1.7	1.7
Grady Meter Station	78.8	Garvin	Rural Electric	94	0	0	0.2	0.2
MLV 1100-2	36.4	Grady	CKenergy or Oklahoma Electric	149	149	100	0.2	0.2
Iron Horse Meter Station	47.5	Grady	Oklahoma Electric	431	54	13	0.5	0.5
MLV 1100-3	55.6	Grady	Oklahoma Electric	217	130	60	0.3	0.3
MLV 1100-4	74.1	Grady	OG&E	446	446	100	0.6	0.6
MLV 1100-5	86.7	Stephens	Rural Electric	99	15	15	0.2	0.2
Tatums Compressor Station/MLV 1200-1/ Velma Receiver	99.4/ VE13.8	Garvin	OG&E	1,476	1,388	94	1.7	1.7
Natural Gas Pipeline Company of America (NGPL) 801 Meter Station/MLV 1200-2	119.1	Carter	Red River Valley Rural Electric Association (REA)	55	55	100	0.1	0.1
MLV 1200-3	136.5	Carter	Red River Valley REA	253	138	55	0.3	0.3
MLV 1200-4	156.2	Johnston	People's Electric or Red River Valley REA	948	0	0	1.1	1.1
MLV 1200-5	175.1	Bryan	Southeastern Electrical Cooperative, Inc.	82	82	100	0.1	0.1

TABLE 1.4-1 (cont'd)								
Non-jurisdictional Powerlines Associated with the MIDSHIP Project								
MIDSHIP Project Facility	Mile-post ^a	County	Non- jurisdictional Power Company ^b	Power- line Length (feet)	Colloca- tion Length ^c (feet)	Colloca- tion ^c (percent)	Total Acreage Affected ^{d, e, f}	
							Const.	Oper.
MLV 1200-6	193.5	Bryan	Southeastern Electrical Cooperative, Inc.	160	0	0	0.2	0.2
NGPL Meter Station	198.4	Bryan	Southeastern Electrical Cooperative, Inc.	59	59	100	0.1	0.1
Bennington Compressor Station/ MLV 1300-1	198.4	Bryan	Southeastern Electrical Cooperative, Inc.	59	59	100	0.1	0.1
Bennington Meter Station/Receiver	198.6	Bryan	Southeastern Electrical Cooperative, Inc.	568	568	100	0.7	0.7
Chisholm Meter Station/Launcher	CH0.0	Kingfisher	Cimarron Electric	690	615	89	0.8	0.8
MLV 1010-2	CH9.4	Kingfisher	Cimarron Electric	115	25	22	0.2	0.2
Velma Meter Station/ Launcher/MLV 1180- 1	VE0.2	Stephens	Cotton Electric	571	450	79	0.7	0.7
Sholem Booster Station/MLV 1180-2	VE7.3	Stephens	Cotton Electric	487	487	100	0.6	0.6
Totals ^f				3,590	4,814	68	10.9	10.9
Source: Oklahoma Association of Electric Cooperatives, 2017								
^a Milepost numbers starting with "CH" and "VE" designate the Chisholm and Velma Laterals, respectively.								
^b The non-jurisdictional power companies listed are the most likely local electric distribution cooperative power source based on the location of the MIDSHIP Project facility. However, power could also come directly from generating and transmission companies/cooperatives.								
^c The powerlines are considered collocated when they run parallel to existing roads, powerlines, and pipelines, including instances when crossing a road perpendicularly.								
^d Assumes 50-foot-wide construction and operational rights-of-way.								
^e Const. = total acres affected by construction; Oper. = total acres that will be maintained for operation.								
^f Totals may not match sum of addends due to rounding.								

TABLE 1.5-1			
Major Permits, Approvals, and Consultations for the MIDSHIP Project			
Agency	Permit/Approval/Consultation	Agency Action	Status
Federal			
FERC	Certificate under section 7(c) of the NGA	Determine whether the project would be in the public interest, and consider issuing a Certificate	Application filed on May 31, 2017
COE, Tulsa District	Department of the Army permit under section 404 of the CWA	Issuance of a permit for discharges of dredged or fill material into waters of the United States	Application filed May 31, 2017; updated September 5, 2017, March 29, 2018, and April 27, 2018
	Department of the Army permit under section 10 of the Rivers and Harbors Act	Issuance of a permit for structures or work in or affecting navigable waters of the United States	Application filed May 31, 2017; updated September 5, 2017, March 29, 2018, and April 27, 2018
U.S. Fish and Wildlife Service, Oklahoma Ecological Services Field Office	Section 7 ESA consultation, Biological Opinion	Consider FERC's finding of impact on federally listed and proposed threatened and endangered species and their critical habitat, and provide a Biological Opinion if the action is likely to adversely affect federally listed species or their critical habitat	Informal consultation initiated October 25, 2016 and ongoing
	MBTA and section 3 of Executive Order 13186	Provide comments regarding project effects on listed migratory birds	Informal consultation initiated October 25, 2016 and ongoing
	Bald and Golden Eagle Protection Act	Provide comments regarding project effects on bald and golden eagles	Informal consultation initiated October 25, 2016 and ongoing
EPA	National Pollutant Discharge Elimination System Hydrostatic Test Water Discharge Permit/Approval	Issuance of a section 402 and hydrostatic test water discharge permit	Application filed April 6, 2018
Bureau of Indian Affairs, Eastern Oklahoma Region	Tribal lands consultation/coordination and Archeological Resources Protection Act Permit	Review and comment on the project and its potential to affect tribal lands	Consultation initiated October 25, 2016; request for Archaeological Resources Protection Act Permit submitted February 5, 2018
Bureau of Indian Affairs, Southern Plains Region	Tribal lands consultation/coordination	Review and comment on the project and its potential to affect tribal lands	Consultation initiated October 25, 2016 and ongoing
U.S. Department of Agriculture, Farm Service Agency, Oklahoma State Office	Conservation Reserve, Emergency Forest Restoration, and other programs consultation	Review and comment on the project and its effects on Conservation Reserve, Emergency Forest Restoration, and other program lands	Consultation initiated October 25, 2016 and ongoing
U.S. Department of Agriculture, Natural Resources Conservation Service, Oklahoma State Office	Prime and other important farmland consultation	Review and comment on the project and its effects on prime and other important farmland	Consultation initiated October 25, 2016 and ongoing

TABLE 1.5-1 (cont'd)			
Major Permits, Approvals, and Consultations for the MIDSHIP Project			
Agency	Permit/Approval/Consultation	Agency Action	Status
Oklahoma			
ODEQ	Air quality permits	Issuance of air quality determination/permits	Anticipate receipt in third quarter 2018
Oklahoma Water Resources Board – Planning and Management Division	Floodplain Development Permit	Issuance of Floodplain Development Permit	Application anticipated to be filed in third quarter 2018
	Surface Water Use Permit	Issuance of Surface Water Use Permit	Application anticipated to be filed in fourth quarter 2018
OCC Districts: II, III, and IV	Notice of Surface Discharge of Hydrostatic Test Water	Receipt of a hydrostatic test water discharge notification	Application anticipated to be filed in fourth quarter 2018
Oklahoma Department of Wildlife Conservation	Rare species consultation	Issuance of clearance to prevent effects on rare state species	Consultation initiated October 25, 2016 and ongoing
Oklahoma Historical Society – State Historic Preservation Office	Section 106 consultation and coordination (historic-period archaeological sites and the built environment)	Review and comment on the project and its effects on historic properties	Consultation initiated October 25, 2016 and ongoing
Oklahoma Archeological Survey	Section 106 consultation and coordination (prehistoric archaeological resources)	Review and comment on the project and its effects on historic properties	Consultation initiated October 25, 2016 and ongoing
Commissioners of Land Office of Oklahoma	Application for easement	Issuance of land easement within Commissioners of the Land Office designated land	Application anticipated to be filed in second quarter 2018
Local			
County/local floodplain management departments	Application(s) for local floodplain permits	Issuance of floodplain permit(s)	Application(s) anticipated to be filed in third quarter 2018

2.0 PROPOSED ACTION

2.1 PROPOSED FACILITIES

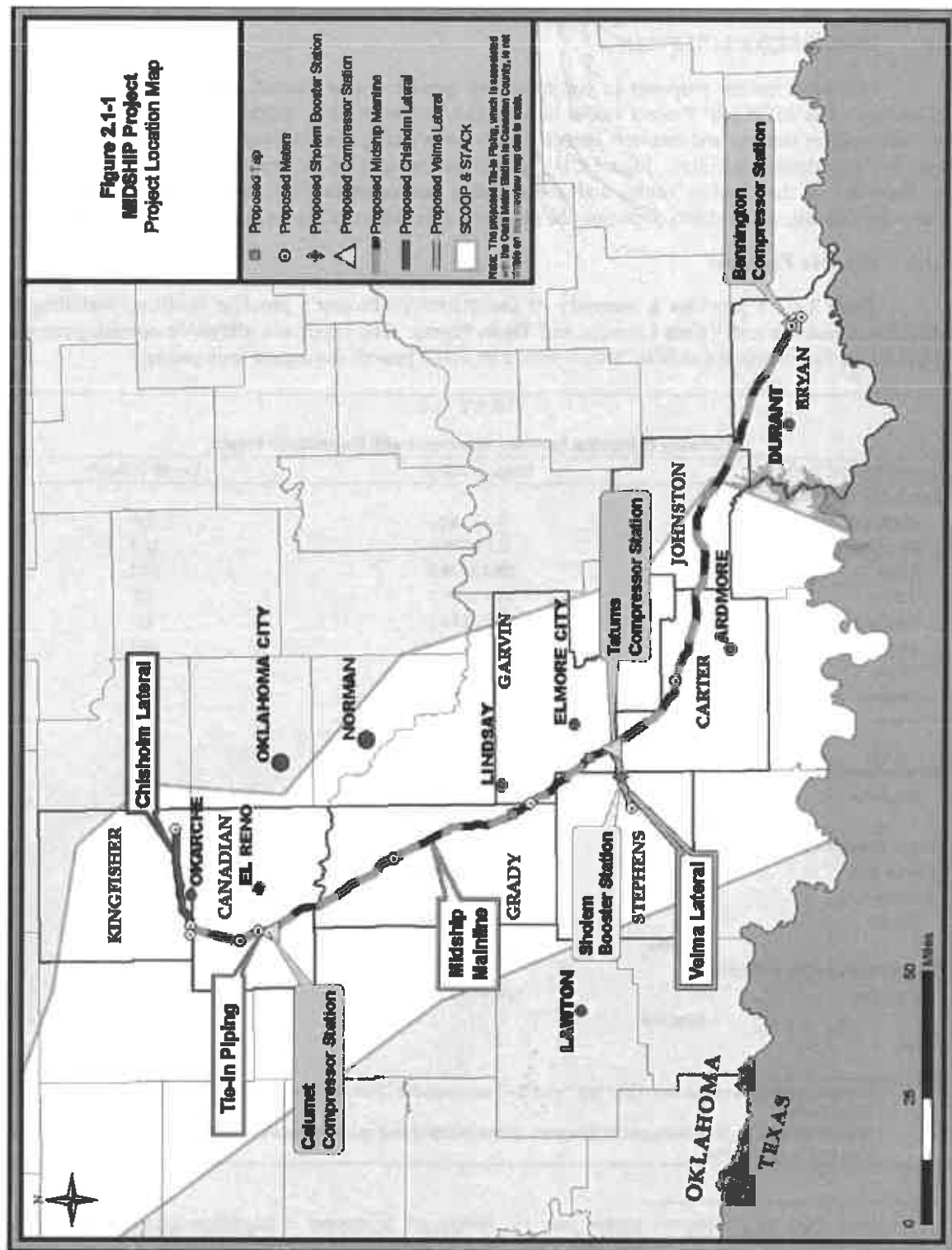
Midship Pipeline proposes to construct and operate a new natural gas transmission system in Oklahoma. The MIDSHIP Project would include 234.1 miles of new, lateral, and tie-in pipelines; three new compressor stations and one new booster station; new receipt and delivery meter stations and receipt taps, and appurtenant facilities. Figure 2.1-1 is an overview map of the project. Detailed maps showing the locations of the pipeline routes and aboveground and other facilities are included in appendix B. More detailed alignment sheets depicting the proposed pipeline route can be accessed on our website.¹

2.1.1 Pipeline Facilities

Table 2.1.1-1 provides a summary of the MIDSHIP Project's pipeline facilities, including the Mainline, Chisholm and Velma Laterals, and Tie-in Piping. The maximum allowable operating pressure (MAOP) for the Mainline and both laterals would be 1,480 pounds per square inch gauge.

TABLE 2.1.1-1		
Summary of Pipeline Facilities Associated with the MIDSHIP Project		
Pipeline Facility/County	Milepost Range ^a	Length (miles) ^b
36-Inch-Diameter Mainline		
Kingfisher	0.0 to 0.5	0.4
Canadian	0.5 to 28.3	27.8
Grady	28.3 to 78.4	50.1
Garvin	78.4 to 85.2	6.8
Stephens	85.2 to 89.7	4.6
Garvin	89.7 to 100.4	10.7
Carter	100.4 to 138.7	38.3
Johnston	138.7 to 170.1	31.4
Bryan	170.1 to 199.8	29.5
Subtotal		199.7
30-Inch-Diameter Chisholm Lateral		
Kingfisher	CH0.0 to CH20.4	20.5
Subtotal		20.5
16-Inch-Diameter Velma Lateral		
Stephens	VE0.0 to VE8.4	8.4
Carter	VE8.4 to VE11.7	3.4
Garvin	VE11.7 to VE13.8	2.1
Subtotal		13.8
24-Inch-Diameter Tie-In Piping		
Canadian	TP0.0 to TP0.2	0.1
Subtotal		0.1
TOTAL		234.1
^a Milepost numbers starting with "CH," "VE," and "TP" designate the Chisholm Lateral, Velma Lateral, and Tie-In Piping, respectively.		
^b Pipeline lengths do not correspond to mileposts due to rounding and route changes that use station equations (resulting in long and/or short miles).		

¹ Alignment sheets for the proposed pipeline route and facilities can be accessed at http://elibrary.ferc.gov/idmws/file_list.asp?accession_num=20170906-5009, http://elibrary.ferc.gov/idmws/file_list.asp?accession_num=20171227-5011, http://elibrary.ferc.gov/idmws/file_list.asp?accession_num=20180112-5096, and https://elibrary.ferc.gov/idmws/file_list.asp?accession_num=20180329-5291



2.1.1.1 Mainline

The Mainline would comprise about 199.7 miles of new 36-inch-diameter pipeline. The Mainline would begin at the existing Okarche Gas Processing Plant at milepost (MP) 0.0 in Kingfisher County; continue in a south-southeastern direction through Canadian, Grady, Garvin, Stephens, Carter, and Johnston Counties, and end at the new Bennington Compressor Station at MP 199.6 in Bryan County.

2.1.1.2 Chisholm Lateral

The Chisholm Lateral would comprise about 20.5 miles of new 30-inch-diameter lateral. The Chisholm Lateral, located entirely within Kingfisher County, would begin at an existing gas supply facility near Kingfisher and end at a tie-in to the Mainline at MP 0.0 near the town of Okarche.

2.1.1.3 Velma Lateral

The Velma Lateral would comprise about 13.8 miles of new 16-inch-diameter lateral. The Velma Lateral would begin at an existing gas supply facility near the town of Velma in Stephens County, pick up gas supply from a facility near Sholem, continue through Carter County, and end at a tie-in to the Mainline at the Tatums Compressor Station near MP 99.4 in Garvin County.

2.1.1.4 Tie-in Piping

The Tie-in Piping would comprise about 0.1 mile of new 24-inch-diameter pipeline. The Tie-In Piping, located entirely on land owned by Enlink Midstream within Canadian County, would begin at the Cana Meter Station and end at a tie-in to the Mainline near MP 15.3.

2.1.2 Aboveground Facilities

The new aboveground facilities associated with the MIDSHIP Project would include:

- three compressor stations;
- one booster station;
- eight receipt meters;
- two receipt taps;²
- four delivery meters; and
- ancillary facilities, including new mainline valves (MLV) and pig launchers and receivers.³

More detailed information regarding the aboveground facilities is included in table 2.1.2-1.

² The receipt taps would be subsurface installations but are included with the aboveground facilities for discussion purposes.

³ A pipeline "pig" is a device used to clean or inspect the pipeline. A pig launcher/receiver is an aboveground facility where pigs are inserted or retrieved from the pipeline.

TABLE 2.1.2-1			
Summary of Aboveground Facilities Associated with the MIDSHIP Project			
Project Facilities	Milepost	County	Description
MAINLINE			
Compressor Stations			
Calumet Compressor Station	17.6	Canadian	New 28,160-horsepower (hp) compressor station, including: <ul style="list-style-type: none"> two Solar Centaur 50 gas-fired turbines/compressor drivers (8,130 hp each), coupled with two Solar C45 compressors one Solar Mars 100 gas-fired turbine/compressor driver (15,900 hp), coupled with one Solar C65 compressor two gas-fired emergency generators (Caterpillar G3512) for operation of the entire station
Tatums Compressor Station	99.4	Garvin	New 44,230-hp compressor station, including: <ul style="list-style-type: none"> two Solar Taurus 70 gas-fired turbines/compressor drivers (10,915 hp each), coupled with two Solar C45 compressors one Solar Titan 130 gas-fired turbine/compressor driver (22,400 hp), coupled with one Solar C75 compressor two gas-fired emergency generators (Caterpillar G3512) for operation of the entire station
Bennington Compressor Station	198.4	Bryan	New 42,260-hp compressor station, including: <ul style="list-style-type: none"> two Solar Centaur 50 gas-fired turbines/compressor drivers (8,130 hp each), coupled with two Solar C45 compressors one Solar Titan 250 gas-fired turbine/compressor driver (30,000 hp), coupled with one Solar C85 compressor two gas-fired emergency generators (Caterpillar G3512) for operation of the entire station
Meter Stations			
Okarche/Mark West Meter Station	0.0	Kingfisher	Two receipt meters and tie-ins at the end of the Chisholm Lateral and beginning of the Mainline
Canadian Valley Meter Station	10.6	Canadian	One receipt meter and tie-in at Canadian Valley Meter Station
Cana Meter Station	15.2	Canadian	One receipt meter and tie-in piping/tap line at the Cana Meter Station
Iron Horse Meter Station	47.5	Grady	One receipt meter and tie-in at the Iron Horse Meter Station
Grady Meter Station	78.8	Garvin	One receipt meter and tie-in at the Grady Meter Station
Natural Gas Pipeline Company of America (NGPL) 801 Meter Station	119.1	Carter	One delivery meter and tie-in at the NGPL 801 Meter Station
NGPL Meter Station	198.4	Bryan	One delivery meter and tie-in within the Bennington Compressor Station
Bennington Meter Station	199.6	Bryan	Two delivery meters and tie-ins at Midcontinent Express Pipeline, LLC and Gulf Crossing Pipeline Company, LLC
Receipt Taps			
Bradley Receipt Tap	74.1	Grady	Receipt tap and tie-in at Bradley natural gas processing plant
Wildhorse Receipt Tap	94.7	Garvin	Receipt tap and tie-in at Wildhorse natural gas processing plant

TABLE 2.1.2-1 (cont'd)			
Summary of Aboveground Facilities Associated with the MIDSHIP Project			
Project Facilities	Milepost	County	Description
MLVs and Pig Launchers/Receivers			
Pig Launcher	0.0	Kingfisher	Pig launcher at Okarche/Mark West Meter Station
Calumet Compressor Station MLV (MLV-1100-1)	17.6	Canadian	New MLV within the Calumet Compressor Station
MLV 1 (MLV-1100-2)	36.4	Grady	New MLV
MLV 2 (MLV-1100-3)	55.6	Grady	New MLV
MLV 3 (MLV-1100-4)	74.1	Grady	New MLV
MLV 4 (MLV-1100-5)	86.7	Stephens	New MLV
Tatums Compressor Station MLV (MLV-1200-1)	99.4	Garvin	New MLV within the Tatums Compressor Station
MLV 5 (MLV-1200-2)	119.1	Carter	New MLV within the NGPL 801 Meter Station
MLV 6 (MLV-1200-3)	136.5	Carter	New MLV
MLV 7 (MLV-1200-4)	156.2	Johnston	New MLV
MLV 8 (MLV-1200-5)	175.1	Bryan	New MLV
MLV 9 (MLV-1200-6)	193.5	Bryan	New MLV
Bennington Compressor Station MLV (MLV-1300-1)	198.4	Bryan	New MLV within the Bennington Compressor Station
Pig Receiver	199.8	Bryan	Pig receiver at the Bennington Meter Station
CHISHOLM LATERAL			
Meter Station			
Chisholm Meter Station	CH0.0	Kingfisher	One receipt meter and tie in at Chisholm
MLVs and Pig Launchers/Receivers			
Pig Launcher	CH0.0	Kingfisher	Pig launcher at the Chisholm Meter Station
Valve 1 (MLV-1010-2)	CH9.4	Kingfisher	New MLV
Pig Receiver	CH20.4	Kingfisher	Pig receiver at the Okarche/Mark West Meter Station
VELMA LATERAL			
Booster Station			
Sholem Booster Station	VE7.3	Stephens	New 3,750-hp booster station, including two Caterpillar G3606 reciprocating compressor engines (1,875 hp each), coupled with two Ariel ABB/6 compressors
Meter Station			
Velma Meter Station	VE0.2	Stephens	One receipt meter and tie-in at Velma
MLVs and Pig Launchers/Receivers			
Pig Launcher and MLV-1180-1	VE0.2	Stephens	Pig launcher and new MLV at Velma
Sholem Booster Station MLV (MLV-1180-2)	VE7.3	Stephens	New MLV at the Sholem Booster Station
Pig Receiver	VE13.8	Garvin	Pig receiver at the Tatums Compressor Station

2.2 LAND REQUIREMENTS

Table 2.2-1 summarizes the land requirements for the MIDSHIP Project. A more detailed description and breakdown of land requirements and use is presented in section 4.8.1. Construction of the project would disturb about 3,340.7 acres of land, including the pipeline facilities, aboveground facilities, contractor yards, and access roads. Midship Pipeline would restore 1,866.3 acres of land disturbed during construction and allow it to revert to its former use.

2.2.1 Pipeline Facilities

Of the 3,049.6 acres of land that would be disturbed during construction of the pipeline facilities (includes the pipeline right-of-way; additional temporary workspace [ATWS] areas; and any appurtenant facilities⁴ within the pipeline right-of-way), 1,386.8 acres would be retained as permanent pipeline right-of-way. The remaining 1,662.8 acres would be used as temporary workspace.

2.2.1.1 Collocation with Existing Rights-of-Way and Utility Crossings

Midship Pipeline has proposed 127.0 miles (54 percent of the pipeline route) to be collocated with or adjacent to existing pipeline, electric transmission utility (i.e., power line), and/or road rights-of-way. For linear, utility-type facilities, collocation of a new easement can involve: a) abutting an existing easement, b) partially overlapping or sharing land within an existing easement, or c) siting a facility wholly within an existing easement. The proposed MIDSHIP Project pipeline routes also cross multiple existing pipeline, electric transmission utility, and road rights-of-way. A summary of the locations where the pipeline would be collocated with existing rights-of-way is presented in appendix C. Where the proposed pipelines would be collocated with existing pipelines, Midship Pipeline states that the new permanent right-of-way would abut the adjacent existing right-of-way to the extent practicable while maintaining the minimum spacing between pipelines as required for safety.

2.2.2 Right-of-Way Configurations

In upland areas, Midship Pipeline proposes to use a 100-foot-wide construction right-of-way for the Mainline and Chisholm Lateral and a 75-foot-wide construction right-of-way for the Velma Lateral and Tie-in Piping. Actual right-of-way configurations and widths would vary based on site-specific conditions including road, railroad crossings, waterbody, and wetland crossings, the need for additional spoil storage, the presence or absence of an existing right-of-way, proximity to adjacent utilities, and use of specialized construction techniques (e.g., horizontal directional drill [HDD]). Midship Pipeline proposes to use a 75-foot-wide construction right-of-way in most wetlands. Drawings depicting the typical right-of-way configurations for the proposed pipelines are included in appendix B. Midship Pipeline has made reductions or minor route variations to the construction rights-of-way, where practicable, at various locations to address specific environmental or residential issues along the proposed pipelines. The construction procedures that would be followed are described in detail in section 2.3.

⁴ Appurtenant facilities within the pipeline right-of-way include the receipt taps, MLVs, pig launchers/receivers, and cathodic protection systems.

TABLE 2.2-1			
Summary of Land Requirements for the MIDSHIP Project ^a			
Facility	County(ies)	Land Affected During Construction (acres) ^b	Land Affected During Operation (acres)
Pipeline Facilities^c			
Mainline	Kingfisher, Canadian, Grady, Garvin, Stephens, Carter, Johnston, Bryan	2,640.8	1,183.2
Chisholm Lateral	Kingfisher	272.7	122.3
Velma Lateral	Stephens, Garvin, Carter	135.0	80.5
Tie-in Piping	Canadian	1.1	0.8
Pipeline Facilities Subtotal		3,049.6	1,386.8
Aboveground Facilities			
Compressor and Booster Stations			
Calumet Compressor Station	Canadian	33.9	17.3
Tatums Compressor Station	Garvin	23.5	19.9
Bennington Compressor Station	Bryan	34.5	22.1
Sholem Booster Station	Stephens	6.9	6.9
Subtotal		98.9	66.2
Meter Stations			
Chisholm Meter Station (one new receipt meter)	Kingfisher	1.3	0.9
Okarche/Mark West Meter Station (two new receipt meters)	Kingfisher	4.2	3.9
Canadian Valley Meter Station (one new receipt meter)	Canadian	1.0	0.7
Cana Meter Station (one new receipt meter)	Canadian	0.2	0.2
Iron Horse Meter Station (one new receipt meter)	Grady	0.9	0.8
Grady Meter Station (one new receipt meter)	Garvin	2.1	1.7
Velma Meter Station (one new receipt meter)	Stephens	1.2	0.9
NGPL 801 Meter Station (one new delivery meter)	Carter	2.5	2.0
NGPL Meter Station (one new delivery meter) ^d	Bryan	0.0	0.0
Bennington Meter Station (two new delivery meters)	Bryan	3.8	3.8
Subtotal		17.3	14.9
Aboveground Facility Subtotal		116.2	81.1
Contractor Yards			
Chickasha Contractor Yard	Grady	27.3	0.0
Yukon Contractor Yard	Canadian	19.3	0.0
Ardmore Contractor Yard	Carter	16.9	0.0
Subtotal		63.5	0.0
Access Roads		111.4	6.5
PROJECT TOTAL		3,340.7	1,474.4
^a Totals may not match the sum of addends due to rounding.			
^b The land affected during construction includes both temporary (construction) and permanent/operational impacts.			
^c Pipeline facilities include the pipeline right-of-way, ATWS, and the appurtenant facilities within the pipeline right-of-way (receipt taps, MLVs, pig launchers/receivers, and cathodic protection systems). Workspace between the HDD entry and exit is not included.			
^d The NGPL Meter Station is within the Bennington Compressor Station site.			

Midship Pipeline proposes to maintain a standard 50-foot-wide permanent right-of-way for the Mainline, Chisholm and Velma Laterals, and Tie-in Piping. Areas disturbed by construction that are not part of the permanent rights-of-way would be restored to preconstruction contours, stabilized, vegetated, and allowed to revert to previous use following the completion of construction activities in accordance with the Plan or applicable agency requirements. Permanent rights-of-way would be maintained in an herbaceous state for the operational life of the pipelines, with the exception of forested wetlands in which partial regrowth of woody vegetation would be allowed. See section 4.4.4 for more details about right-of-way maintenance in wetlands.

2.2.3 Additional Temporary Workspace

In addition to the various construction right-of-way configurations described above, Midship Pipeline has requested ATWS in some locations due to constructability constraints or site-specific construction-related reasons. Appendix D identifies where Midship Pipeline has requested ATWS for resource crossings and soil storage, including the acreage of impact, associated land use, and the justification for their use. A detailed explanation and evaluation of Midship Pipeline's requests for extra workspace is provided in sections 4.3.2.6 and 4.4.5.

ATWSs beyond those currently identified could be required during construction of the pipeline. Prior to construction, Midship Pipeline would be required to file a complete and updated list of all extra work areas, including any requested additional contractor yards for Commission review and approval (see Post-Approval Variance Process in section 2.5.4).

2.2.4 Aboveground Facilities

Construction of the new aboveground facilities would require the use of 116.2 acres of land, including 35.1 acres of temporary workspace and 81.1 acres that would be permanently used for operation of the aboveground facilities (see table 2.2-1). The new aboveground facilities proposed for the project include three compressor stations, one booster station, eight receipt meters, two receipt taps, four delivery meters, and ancillary facilities (e.g., MLVs, pig launchers/receivers) (see table 2.1.2-1).

Construction of the compressor stations would require 91.9 acres of land, including 33.9, 23.5, and 34.5 acres for the Calumet, Tatums, and Bennington Compressor Stations, respectively. About 59.3 acres would be retained during operation, including 17.3, 19.9, and 22.1 acres for the Calumet, Tatums, and Bennington Compressor Stations, respectively. Construction of the Sholem Booster Station would require about 6.9 acres of land, all of which would be retained for operation of the facility. Construction of the new receipt and delivery meters would require about 17.3 acres of land, about 14.9 acres of which would be retained for operation. The land required for construction and operation of the proposed new receipt taps and MLVs is already reflected in the proposed pipeline facilities acreage totals above (see table 2.2-1 and section 2.2.1).

2.2.5 Contractor Yards and Staging Areas

To support construction activities, Midship Pipeline proposes to use three contractor yards (the Yukon, Chickasha, and Ardmore Yards). The contractor yards would be used for office trailers, parking, and pipe and equipment storage. Use of the contractor yards would temporarily affect about 63.5 acres of land (see section 4.8.1.4 for additional information regarding land use). The proposed Yukon Contractor Yard site is about 12.0 miles northeast of Mainline MP 25.6 in Oklahoma City, Canadian County. The proposed Chickasha Contractor Yard site is about 9.0 miles west of Mainline MP 57.6 in Chickasha,

Grady County. The proposed Ardmore Contractor Yard is about 0.2 mile northeast of Mainline MP 125.5 in Carter County. These yards are depicted on the maps in appendix B.

2.2.6 Access Roads

In addition to public roads, Midship Pipeline proposes to use 116 access roads to construct the project (see maps in appendix B). Of these 116 roads, 25 roads would be permanently maintained for operations and the remaining 91 would be restored to preconstruction conditions or left in place in accordance with landowner agreements following completion of the project. Of the permanent and temporary access roads, 83 are existing roads that would require only minor modifications and 7 are existing roads that would require some new construction to extend their length. The remaining 26 access roads, including 17 of the permanent access roads, would be newly constructed. Midship Pipeline is proposing construction access road widths between 15 and 30 feet; however, the majority (over 80 percent) would be 25 feet wide. Modifications to existing roads could include widening, grading, installation of culverts, and/or addition of gravel. The location, description, length, land use, reason for use, and type of improvement required (if any) for each of the access roads are listed in appendix E.

2.3 CONSTRUCTION PROCEDURES

The MIDSHIP Project would be designed, constructed, tested, operated, and maintained in accordance with all applicable requirements included in the U.S. Department of Transportation (DOT) regulations in 49 CFR 192, *Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards*. These regulations are intended to ensure adequate protection for the public. Among other design standards, Part 192 specifies pipeline material and qualification, minimum design requirements, and protection from internal, external, and atmospheric corrosion.

To reduce construction impacts, Midship Pipeline would implement FERC's *Upland Erosion Control, Revegetation, and Maintenance Plan* (Plan) and *Wetland and Waterbody Construction and Mitigation Procedures* (Procedures)⁵ (with the exception of alternative measures where sufficiently justified and deemed acceptable by OEP staff), as well as conditions resulting from the Certificate and other project permits. In addition, Midship Pipeline would implement its proposed project-specific plans and measures developed to avoid or minimize environmental impacts during construction, which are discussed throughout this EIS.

Midship Pipeline proposes modifications from the standard FERC Procedures (see table 2.3-1). These alternative measures are described and evaluated in more detail in sections 4.3.2.6 and 4.4.5, which also include our recommendations for the appropriateness of these modifications.

To avoid or minimize the potential for environmental impacts from spills or leaks during construction, Midship Pipeline has developed *Spill Prevention and Response Procedures* (SPRP), which describe spill and leak prevention measures, procedures for spill containment and cleanup, and emergency notifications. Additional information about Midship Pipeline's SPRP is presented in sections 4.2.2.6 and 4.3.1.7.

⁵ The FERC Plan and Procedures are a set of construction and mitigation measures that were developed in collaboration with other federal and state agencies and the natural gas pipeline industry to minimize the potential environmental impacts of the construction of pipeline projects in general. The FERC Plan and Procedures can be viewed on the FERC Internet website at <http://www.ferc.gov/industries/gas/enviro/plan.pdf> and <http://www.ferc.gov/industries/gas/enviro/procedures.pdf>, respectively.

TABLE 2.3-1 Summary of Proposed Modifications to the FERC Procedures				
Procedures Section No.	Measure	Proposed Modification	Justification for Proposed Modification	FERC's Recommendation
V.B.2	Locate all extra work areas (such as staging areas and additional spoil storage areas) at least 50 feet away from water's edge, except where the adjacent upland consists of cultivated or rotated cropland or other disturbed land.	At specific identified locations, Midship Pipeline proposes to locate ATWS within 50 feet of the water's edge.	No practicable alternative is available or the proposed ATWS location would minimize environmental impacts. Midship Pipeline would implement best management practices to protect the waterbodies in accordance with the Procedures.	Request appears justified at most locations. Additional site-specific information or mitigation measures requested at several sites (see section 4.3.2.6).
VI.B.1	Locate all extra work areas (such as staging areas and additional spoil storage areas) at least 50 feet away from wetland boundaries, except where the adjacent upland consists of cultivated or rotated cropland or other disturbed land.	At specific identified locations, Midship Pipeline proposes to locate ATWS within 50 feet of the wetland boundary.	No practicable alternative is available. Midship Pipeline would implement best management practices to protect the wetlands in accordance with the Procedures.	Request appears justified at all locations (see section 4.4.5).

2.3.1 General Pipeline Construction Procedures

This section describes Midship Pipeline's proposed general procedures for construction of the MIDSHIP Project. Figure 2.3.1-1 illustrates the standard, assembly line construction sequence typically used in upland areas for pipelines. Midship Pipeline proposes to have two of these assembly lines or "spreads" that would each be simultaneously completing construction activities at different locations along the route. Other specialized construction methods, such as conventional bore and HDD methods used to cross under sensitive resources, residential-specific methods, and procedures for crossing of waterbodies and wetlands would also be employed. These specialized construction methods are described below.

Construction procedures for aboveground facilities are described in section 2.3.3.

Surveying and Staking

After Midship Pipeline completes land or easement acquisition and before the start of construction, crews would mark/stake the limits of the approved work areas (the construction right-of-way boundaries and ATWS, the pipeline centerline, and approved access roads). Midship Pipeline would clearly mark wetland boundaries and other environmentally sensitive areas (e.g., cultural resource sites, rare species habitat) identified in landowner easement agreements, environmental permit conditions, survey results, or by federal, state, or local agencies. In addition, existing utility lines (e.g., cables, conduits, pipelines) would be marked to prevent accidental damage during construction.

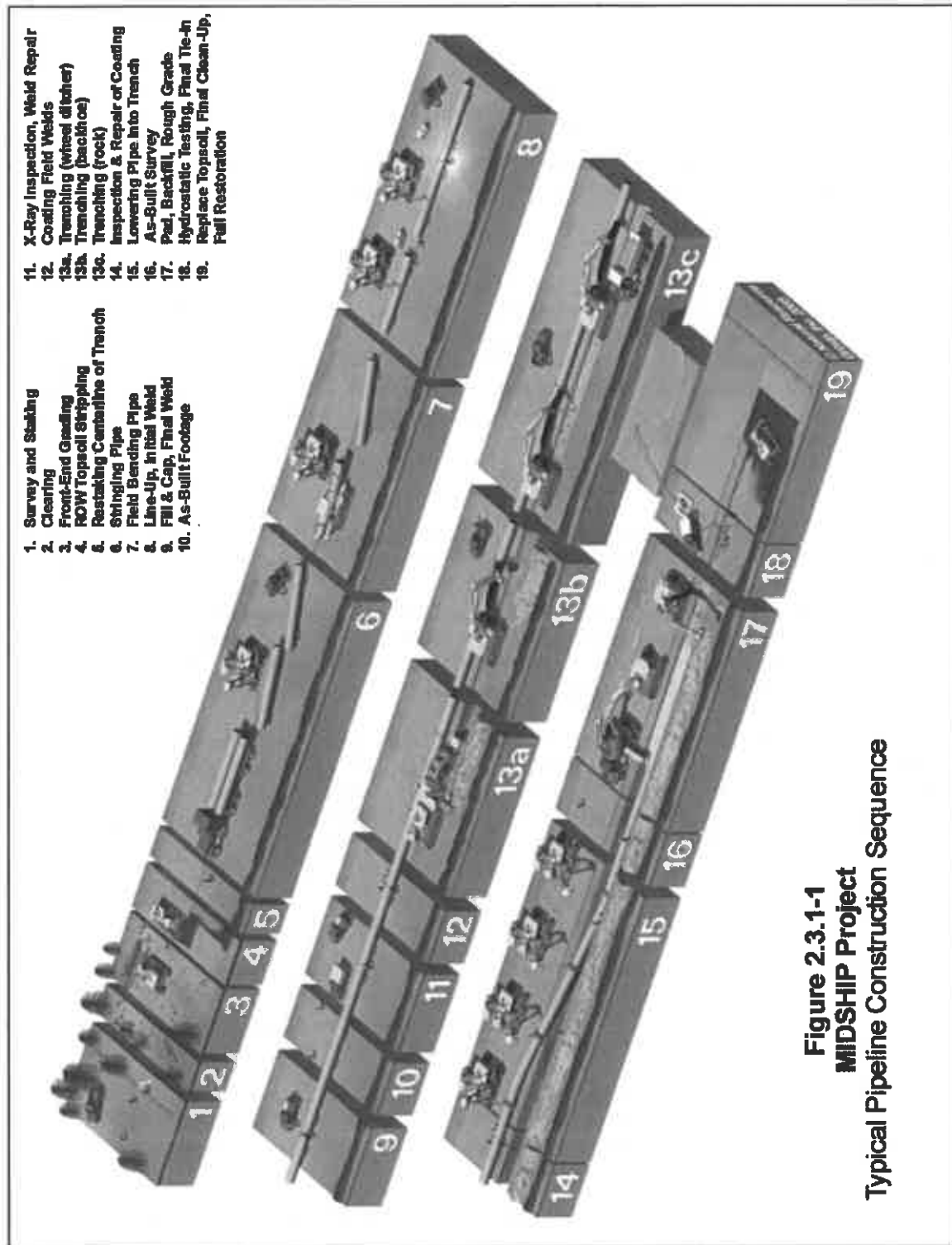


Figure 2.3.1-1
MIDSHIP Project
Typical Pipeline Construction Sequence

Erosion and Sediment Control

After initial soil disturbance (typically after clearing and prior to the start of grading activities), Midship Pipeline would install temporary soil erosion and sediment control measures along the proposed construction work areas (e.g., rights-of-way, ATWS areas, access roads) as needed, in accordance with the Plan and Procedures. The best management practices included in the Plan are designed to minimize erosion of disturbed soils and prevent the transportation of sediment outside of the work area and into environmentally sensitive areas, such as wetlands and waterbodies. In accordance with the Plan, erosion and sediment control measures would be maintained until the construction workspace is fully stabilized.

Clearing

Midship Pipeline would remove trees, brush, and other existing vegetation from approved work areas via mechanical means (e.g., feller-bunchers, hydroaxes, forwarders, skidders) or hand-cutting. Midship Pipeline would cut tree stumps as low to the ground as possible, remove stumps from the trench line, and may conduct additional stump pulling from the construction work areas if deemed necessary for safety reasons. In wetlands, Midship Pipeline would limit stump pulling to the trench line and other areas where it is deemed necessary for safety reasons. Stumps and rootstock would be left intact in wetland areas to promote revegetation following construction.

Grading

Where necessary, the entire width of the construction right-of-way, including the temporary construction workspace, would be rough graded with bulldozers to allow for safe passage of equipment and to prepare the work surface for pipeline installation activities. In accordance with the Procedures, grading in wetlands would be limited to the area directly over the trenchline unless safety-related construction constraints require grading from the working side of the construction right-of-way. Generally, machinery would operate on one side of the trench (working side), and excavated materials would be stockpiled on the other side (non-working side).

Unless otherwise approved in writing by the landowner, topsoil segregation would occur in agricultural and residential lands, and in other areas as requested by landowners. Up to 12 inches of topsoil would be removed and kept segregated from subsoil until replacement that is described in the Lowering-in and Backfilling section below. Topsoil may be replaced with appropriate imported material as necessary in residential areas. Typical construction cross-section and drawings are provided in appendix B.

Trenching

Midship Pipeline would excavate the trench with a track-mounted excavator or ditching machine to provide at least the minimum depth of cover as required by 49 CFR 192 (generally at least 3 feet of cover). In certain areas, such as at crossings of major waterbodies, foreign pipelines and utilities, and actively cultivated agricultural lands, deeper burial may be required resulting in an increased trench depth.

The project would cross underground utilities in various locations. Prior to construction, Midship Pipeline would require its construction contractors to contact the "Call Before You Dig" or "One Call" system to identify and mark all underground utilities (e.g., cables, conduits, pipelines) to minimize the potential for accidental damage during construction.

Midship Pipeline would temporarily pile soil excavated from the trench to one side of the right-of-way, adjacent to the trench. Where required, subsoil would be segregated from the previously stockpiled topsoil. Where trench dewatering is needed, Midship Pipeline would discharge the water to a

well-vegetated upland area and/or through a filter bag or siltation barrier in accordance with the Procedures. See section 4.2.2.6 for information regarding Midship Pipeline's procedures for the unanticipated discovery of contaminated soil or groundwater.

Additionally, Midship Pipeline has developed *Procedures Guiding the Discovery of Unanticipated Cultural Resources and Human Remains* should those features be discovered during trenching or construction. See section 4.10.4 for additional information.

Pipe Stringing, Bending, and Welding

Once the trench is excavated, Midship Pipeline would string the pipe along the trench. Stringing would involve hauling the pipe, typically in 40- or 60-foot lengths (referred to as joints), from the contractor yard onto the right-of-way. The pipe would be off-loaded from trucks and placed next to the trench using a sideboom tractor or vacuum excavator. Typically, several pipe joints are lined up end-to-end (or "strung") to allow for welding into continuous lengths known as strings. Individual joints would be strung along the right-of-way parallel to the centerline so they are easily accessible to construction personnel.

The pipe would typically be delivered to the contractor yards and work areas in straight sections; however, some prefabricated bending may be necessary for sharp bends. Field bending of the pipe would also be required to enable the pipeline to follow the natural grade and direction changes of the right-of-way. A bending engineer would survey the trench to determine where field bends would be required and then a hydraulic bending machine would field-bend the pipe as needed.

Following stringing and bending, the individual pipe joints would be aligned and welded together. Midship Pipeline would perform all welding in accordance with American Petroleum Institute Standard No. 1104. Individual pipe sections would be welded into long strings in two steps. First, a front-end welding crew would clean and align the pipe bevels and place at least the first two passes in the welding process. The back-end welders would then complete the welds. Automatic welding may also be used.

Midship Pipeline would visually examine and non-destructively test every completed weld to determine its quality using radiographic or ultrasonic testing in accordance with 49 CFR 192. Radiographic and ultrasonic examination are methods of inspecting the inner structure of welds and determining the presence of defects. Midship Pipeline would be required to repair or remove any welds that do not meet the regulatory standards and established specifications. After a weld is approved, the joint would be cleaned and coated with an industry-approved anti-corrosion coating. The coating on the entire pipe section would be inspected and any damaged areas repaired.

Lowering-In and Backfilling

Before the pipeline is lowered-in, Midship Pipeline would inspect the trench to ensure that it is free of rocks and other debris that could damage the pipe or protective coating. Water present in the trench would be removed in accordance with the Procedures.

After the pipe is lowered into the trench (generally by sideboom tractors), final tie-in welds would be made, inspected, and coated, and the trench would be backfilled. The backfill would typically consist of the original material excavated from the trench; however, where there is not sufficient padding material on site or when the native material that was excavated from the trench is not suitable backfill material (i.e., rocky), Midship Pipeline would acquire backfill from other off-site sources in accordance with applicable permit/agency requirements. In areas where topsoil has been segregated, Midship Pipeline would place the subsoil in the trench first and would place the topsoil over the subsoil. Backfilling would

occur to approximate grade; however, the top of the trench may be slightly crowned to compensate for settling except in wetland areas. Midship Pipeline would inspect the backfilled soil and conduct decompaction if necessary.

Tie-ins

A tie-in is typically a relatively small segment of pipeline specifically used to cross certain features as needed. Special tie-in crews may be used at some locations, such as at waterbody and road crossings, at changes in topography, and at other selected locations as needed. Once the pipeline segment is installed across the feature, the segment is then welded to the rest of the pipeline.

Cleaning

After tie-ins have been completed, Midship Pipeline would clean the inside of the pipeline to remove any dirt, water, or debris inadvertently collected in the pipe during installation. A manifold would be installed on one end of the pipeline section and a cleaning "pig" (typically a large soft plug used to swab the inside of the pipeline) would be propelled by compressed air through the pipeline.

Hydrostatic Testing

After cleaning, Midship Pipeline would hydrostatically test the pipe to ensure that the system is capable of withstanding the operating pressure for which it was designed. Hydrostatic testing involves capping a segment of pipe, filling the pipeline with water, and pressurizing the water in the pipeline for a minimum of 8 hours to confirm the pipeline's integrity. If a loss of pressure is detected that cannot be attributed to other factors (e.g., temperature), Midship Pipeline would repair any detected leaks and retest the pipeline segment. The testing would be done in segments according to Midship Pipeline's requirements and the DOT's specifications in 49 CFR 192. The exact sequence and timing of hydrostatic testing would depend on the final schedule for construction (section 2.4).

Midship Pipeline's proposed hydrostatic test water withdrawal and discharge locations and volumes are identified in section 4.3.2.5. Following satisfactory completion of hydrostatic testing, Midship Pipeline would pump the test water to the next pipeline segment for testing, discharge the water in an upland area through an energy-dissipating device designed to slow the flow of water, or haul away the discharged water to an approved disposal site. Once a segment of pipe has been successfully tested and dried, Midship Pipeline would remove the test cap and manifold and connect the pipe segment to the remainder of the pipeline. Drying pigs would be used to dry the pipeline; no desiccant or chemical additives are proposed. Midship Pipeline would conduct hydrostatic testing activities in accordance with applicable water withdrawal and discharge permits.

Cleanup and Restoration

Midship Pipeline would final grade and restore all work areas, and install permanent erosion control measures within 20 days of backfilling the trench, weather and soil conditions permitting (10 days for residential areas as required by the Plan). Permanent slope breakers or diversion berms would be constructed and maintained as needed in accordance with the Plan and Procedures. Fences and other structures would be restored or repaired as necessary. If seasonal or other weather conditions prevent compliance with these timeframes, Midship Pipeline would maintain temporary erosion controls until conditions allow completion of final cleanup in accordance with the Plan and Procedures.

Soils that supported vegetation prior to construction would be revegetated using seed mixes, application rates, and timing windows recommended by local soil conservation authorities, other resource

agencies (e.g., U.S. Department of Agriculture's [USDA] Natural Resources Conservation Service [NRCS]), or landowner requests. Additionally, Midship Pipeline would monitor revegetation after construction to evaluate and correct areas requiring remediation (see section 2.5.5).

Cathodic Protection

Midship Pipeline would install cathodic protection systems along the pipeline to prevent the corrosion of metal surfaces over time. Cathodic protection equipment could consist of underground negative connection cables, linear anode cable systems, aboveground junction boxes, and rectifiers. Midship Pipeline would regularly monitor cathodic protection units installed along the pipeline to maintain required pipe-to-soil potential in accordance with its specifications, which would meet or exceed DOT regulations.

2.3.2 Specialized Construction Procedures

Construction through areas containing sensitive resources (e.g., wetlands, waterbodies) or in areas with construction constraints (e.g., residential, road/railroad/utility crossings, actively cultivated agricultural land, rocky areas) would require construction techniques that differ from the standard measures described above. Midship Pipeline's special construction techniques are summarized below.

Wetland Crossings

The proposed pipeline would cross palustrine emergent (PEM), palustrine scrub-shrub (PSS), and palustrine forested (PFO) wetlands. Wetland resources are described and impacts evaluated in detail in section 4.4. The width of the construction right-of-way within wetlands would be limited to 75 feet unless otherwise approved by FERC based on site-specific conditions. Midship Pipeline would construct within and restore wetlands in accordance with the wetland construction and mitigation measures contained in the Procedures and applicable permits. Typical wetland crossing diagrams are included in appendix B.

Where site-specific conditions allow, Midship Pipeline would leave a vegetated buffer between the wetland and upland construction areas, except along the pipe trench and travel lane. Midship Pipeline would install and maintain sediment barriers (e.g., silt fence, straw bale structures) as needed to minimize the potential for sediment runoff into off-right-of-way areas in accordance with the Procedures. Trees and shrubs would be cut flush with the surface of the ground and removed from the wetland. Stump removal, topsoil segregation, and excavation would be limited to the area immediately over the trenchline to avoid excessive disruption of wetland soils and the native seed and rootstock within the wetland. Limited stump removal may be conducted in other areas if required due to safety concerns.

Standard pipeline construction, similar to construction methods described for uplands, may be conducted in non-saturated wetlands. In areas of saturated soils or standing water, Midship Pipeline would use low-ground-weight construction equipment and/or temporary construction mats to reduce rutting and the mixing of topsoil and subsoil. In unsaturated wetlands, up to the top 12 inches of topsoil would be stripped from the trenchline and stored separately from the subsoil.

Pipe installed in saturated wetlands is typically coated with concrete or equipped with set-on weights to provide negative buoyancy. After the pipeline sinks to the bottom of the trench, a trackhoe working on equipment mats backfills the trench. Prior to backfilling, Midship Pipeline would install trench plugs/breakers where necessary to prevent subsurface drainage of water from wetlands. Because little or no grading typically occurs in wetlands, restoration of contours would be accomplished during backfilling. Where topsoil has been segregated from subsoil, Midship Pipeline would backfill the subsoil

first, followed by the topsoil. Temporary construction mats used for equipment support would be removed from wetlands following backfilling.

Midship Pipeline would install permanent sediment barriers (trench breakers, slope breakers, and/or other permanent erosion control barriers) at the base of slopes near wetland boundaries to prevent sediment transport into the wetlands. Following construction, Midship Pipeline would maintain a 10-foot-wide strip centered over the pipeline in an herbaceous state for maintenance purposes and would selectively cut trees within 15 feet of the pipeline with roots that could compromise the integrity of the pipeline coating.

Midship Pipeline proposes to cross several wetlands using the HDD method (see Horizontal Directional Drill Crossings section below).

Waterbody Crossings

Midship Pipeline would construct waterbody crossings in accordance with federal, state, and local permits and the Procedures. Surface water resources are addressed further in section 4.3.2, and aquatic resources are addressed in section 4.6.2. Potential impacts on fisheries resources are also included in section 4.6.2.

Midship Pipeline proposes to cross waterbodies using the wet open-cut, dry (flume or dam-and-pump), or HDD crossing methods.

The pipeline crossings would typically require extra workspaces on each side of the waterbody to stage construction, fabricate the pipeline, and store materials. These extra workspaces would be a minimum of 50 feet from the waterbody edge, except where site-specific conditions require a reduced setback (see sections 2.3 and 4.3.2.6).

Installation of temporary equipment bridges may be required over some waterbodies. Per the Procedures, equipment bridges may include clean rock fill over culverts, railroad car bridges, equipment pads with or without culverts, flexi-float or portable bridges, and other types of spans. These bridges would remain in place throughout construction until they are no longer needed. Each bridge would be designed to accommodate stream flows anticipated during construction and would be maintained to prevent soil from entering the waterbody. All construction equipment would be required to use the bridges, except for the clearing equipment needed for installation of the equipment bridges. The number of clearing equipment crossings of each waterbody would be limited to one per piece of equipment.

Midship Pipeline would install sediment barriers immediately after disturbance of the waterbody or adjacent upland. Sediment barriers would be properly maintained throughout construction and reinstalled as necessary until replaced by permanent erosion controls, or restoration of adjacent upland areas is complete and revegetation has stabilized the disturbed area.

Wet Open-Cut Crossing Method

This method typically involves the use of backhoe-type excavators working from stream banks to excavate a trench across the waterbody during flowing conditions. A prefabricated section of pipe, weighted as necessary to provide negative buoyancy, would be lowered into the trench. The previously removed trench spoil would be used as backfill material to provide a minimum of 5 feet of cover over the pipeline. Waterbody bed and bank contours would be restored to preconstruction conditions and the banks would be stabilized as soon as possible following construction activities.

Midship Pipeline indicated it would complete in-stream construction within 24 hours for minor waterbodies (less than 10 feet wide) and within 48 hours for intermediate waterbodies (10 to 100 feet wide). In addition, Midship Pipeline committed to following the Procedures to minimize water quality impacts during construction, including the installation of permanent and temporary erosion control structures as needed to minimize erosion.

See section 4.3.2.5 for more information regarding wet open-cut crossing methods.

Dry Crossing Methods

Dry crossings of waterbodies involve conventional trenching of channels that are dry at the time of crossing. This construction technique is similar to the standard pipeline installation process described above for uplands. Midship Pipeline may use two dry crossing methods to cross waterbodies: the flume crossing method and the dam-and-pump crossing method.

The flume method involves diverting the flow of water across the construction work area through one or more flume pipes placed in the waterbody. The first step involves placing a sufficient number of adequately sized flume pipes in the waterbody to accommodate the highest anticipated flow during construction. After the flume pipe(s) is placed in the waterbody, sand bags or equivalent dam diversion structures are installed in the waterbody upstream and downstream of the trench area to divert the water flow through the flume pipe(s), thereby isolating the water flow from the construction area between the dams. The flume pipe(s) and dams remain in place during pipeline installation and until the stream bed and banks are restored.

The dam-and-pump method is similar to the flume crossing method except that pumps and hoses are used instead of flumes to move water across or around the construction work area. The technique involves installing a pump upstream of the crossing and running a discharge hose from the pump across the construction area to a discharge point downstream of the construction area. After the pump is installed and operational, sandbags or equivalent dam diversion structures are installed upstream and downstream of the trench area to isolate the water flow from the construction area between the dams. An energy dissipation device is typically used to prevent scouring of the stream bed at the discharge location of both methods. Water flow is maintained throughout the dam-and-pump operation until the pipeline is installed and banks are restored and stabilized.

The feasibility of using the flume or dam-and-pump crossing methods is dependent on the size of the waterbody, flow characteristics, and channel morphology. The flume construction method is favorable for use on streams where there is a relatively straight channel that allows the placement of sufficiently-sized pipes to convey water across the crossing location. The dam-and-pump method is typically used at smaller waterbody crossings with lower flow rates that can be conveyed from the upstream side of the crossing location to the downstream side of the crossing via portable pumps. Both of these methods would isolate the in-stream trenching activities from the stream flow to minimize turbidity and downstream sedimentation.

Horizontal Directional Drill Crossings

Midship Pipeline proposes to use the HDD construction method at 13 locations, 11 along the Mainline and 2 along the Velma Lateral. As shown in table 2.3.2-1, 12 of the HDDs would span a total of 17 waterbodies). No HDDs are planned along the Chisholm Lateral.

TABLE 2.3.2-1			
Proposed Horizontal Directional Drills Associated with the MIDSHIP Project			
Feature	Milepost		Rationale for HDD Crossing
	Begin	End	
North Canadian River	7.8	7.8	Avoid water quality and habitat impacts
Interstate 40 (Historic Route 66)/ Tributary to the North Canadian River	15.5	15.8	Drill under interstate and avoid water quality and habitat impacts
Canadian River	28.0	28.6	Avoid water quality and habitat impacts
Oklahoma Kansas and Texas Railroad	36.7	37.0	Drill under railroad
Washita River Crossing 1	64.8	65.1	Avoid water quality and habitat impacts
Wildhorse Creek	100.4	100.6	Avoid water quality and habitat impacts
Henry House Creek	120.1	120.4	Avoid water quality and habitat impacts
Washita River Crossing 2	135.7	136.1	Avoid water quality and habitat impacts
Rock Creek (and one tributary)	151.5	152.1	Avoid water quality and habitat impacts
Pennington Creek	154.0	154.3	Avoid water quality and habitat impacts
Blue River (and three tributaries)	173.8	174.2	Avoid water quality and habitat impacts
Velma PFO (Includes one tributary to Wildhorse Creek)	VE9.4	VE9.5	Avoid water quality and habitat impacts
State Highway 76 (Includes two tributaries to Wildhorse Creek)	VE11.4	VE11.5	Drill under highway and avoid water quality and habitat impacts

The HDD method involves establishing land-based staging areas along both sides of the proposed crossing. The process commences with the boring of a pilot hole beneath the waterbody and then enlarging the hole with one or more passes of a reamer until the hole is the necessary diameter to facilitate the pull-back (installation) of the pipeline. Once the reaming passes are completed, a prefabricated pipe segment is then pulled through the hole to complete the crossing. Unless unforeseen events occur, such as inadvertent releases of drilling mud, Midship Pipeline's use of the HDD method would avoid disturbing surface and shallow subsurface features (e.g., waterbodies, wetlands, vegetation) between the HDD entry and exit holes. The only planned activities between the HDD entry and exit points would be limited hand clearing of vegetation as needed to facilitate placement of the electric guide wires that track the progress of the drilling operation and/or for rubber tired vehicles to carry hoses or pumps to access approved water sources.

Throughout the drilling process, a non-toxic slurry of bentonite clay and water is typically pressurized and pumped through the drilling head to lubricate the drill bit, remove drill cuttings, and hold the hole open. This slurry, referred to as drilling mud or drilling fluid, has the potential to be inadvertently released to the surface if fractures, fissures, or other conduits to the surface are encountered. The potential for an inadvertent release is generally greatest during the drilling of the pilot hole when the pressurized drilling mud is seeking the path of least resistance. The path of least resistance is typically back along the path of the drilled pilot hole after its completion. However, if the drill path becomes temporarily blocked or large fractures or fissures that lead to the surface are crossed, then an inadvertent release could occur. Midship Pipeline would monitor the pipeline route and the circulation of drilling mud throughout the HDD operation for indications of an inadvertent drilling mud release and would immediately implement corrective actions if a release is observed or suspected. The corrective actions that Midship Pipeline would implement, including the agencies it would notify and the steps it would take to clean up and dispose of a release, are outlined in Midship Pipeline's *Horizontal Directional Drill Procedures and Mud Monitoring Plan* (HDD Plan) (see appendix F). See section 4.3.2.6 for more information.

Road, Railroad, and Utility Crossing Methods

The MIDSHIP Project would cross 391 public and private roads, including 310 along the Mainline, 40 along the Chisholm Lateral, and 41 along the Velma Lateral. The project would cross eight railroads, including seven along the Mainline and one along the Chisholm Lateral, and several existing utilities. A comprehensive list of the road and railroad crossings and the proposed crossing methods is provided in appendix G.

Midship Pipeline would cross roads, railroads, and utilities using the open-cut, conventional bore, or HDD methods, depending on site-specific conditions and landowner/easement holder requirements. Typical construction drawings for public roadway crossings are provided in appendix B. Paved roadways would generally be crossed using the conventional bore method. Of the eight proposed railroad crossings, seven would be crossed by the conventional bore method and one by the HDD method. A description of the HDD construction technique is provided above. Conventional bore and open-cut road crossing methods are described below.

The use of conventional bore and HDD methods would avoid road and rail surface impacts, but the use of the open-cut crossing method would not. Midship Pipeline would be required to obtain road crossing permits from the applicable federal, state, and local agencies. These permits would dictate the specific requirements for the day-to-day construction activities and methods at each crossing. Prior to road and railroad crossing construction, Midship Pipeline would locate all existing underground utilities using the "Call Before You Dig" or "One Call" system, field instrumentation, and test pits (or potholing).

Conventional bore crossings consist of creating a tunnel-like shaft for a pipeline to be installed below roads or other sensitive resources without affecting the surface of the resource. Bore pits are excavated on both sides of the resource to the depth of the adjacent trench and graded to match the proposed slope of the pipeline. A boring machine is then used within the bore pit to tunnel under the resource by using a cutting head mounted on an auger. The auger rotates and is advanced forward as the hole is bored. The pipeline is then pushed through the bore hole and welded to the adjacent section of pipeline.

Open-cut road crossings involve excavation of the trench across the roadway and installation of the pipeline. Trenching would typically be accomplished using a trackhoe augmented by hand-shoveling where necessary to expose and protect existing utilities. Any existing utilities exposed during excavation would typically be supported at their existing elevations throughout the crossing operation until backfilling is completed. Gravel surfaces would be restored to preconstruction conditions following restoration, unless otherwise approved in writing by applicable regulatory agencies and/or landowner agreements. If paved roads are crossed by the open-cut method, the pavement over the trench would be cut and removed prior to excavation of the trench. After installation of the pipeline across the roadway, the pavement would be restored in accordance with the road crossing permit requirements.

When constructing on or across residential streets, Midship Pipeline would maintain at least one open lane of traffic. During brief periods when road blockage is unavoidable due to actual pipeline installation, Midship Pipeline would implement measures to allow travel over the work area by emergency and other vehicles (e.g., steel plate bridges). Traffic flow and home access would be maintained, except during the temporary periods essential for installing the pipeline.

Agricultural Areas

The MIDSHIP Project pipeline routes and aboveground facilities would affect primarily rural areas currently used for agricultural purposes and open space. Prior to construction in agricultural lands,

Midship Pipeline would work with landowners to identify any drain tiles within the construction workspace. Any drain tiles damaged during construction would be repaired to landowner specifications or to preconstruction condition. Midship Pipeline would be required to use qualified drain tile specialists to conduct or monitor repairs to drain tile systems in accordance with the Plan. Other measures Midship Pipeline would implement to prevent or minimize impacts where constructing in agricultural lands include, but are not limited to:

- preservation, segregation, and replacement of topsoil in cultivated or rotated agricultural lands and pastures and hayfields unless otherwise approved in writing by the landowner;
- a minimum of 4 feet of soil cover in cropland over the installed pipeline, unless otherwise specified by the landowner;
- soil decompaction as needed; and
- post-construction monitoring of restored areas.

See section 4.8.4 for more information about impacts on agricultural lands affected by the project.

Residential Areas

No residences are within 50 feet of the proposed construction right-of-way or temporary workspace. Section 4.8.3 provides additional information regarding the other structures within 50 feet of the construction right-of-way or temporary workspace.

2.3.3 Aboveground Facility Construction Procedures

Activities associated with construction of the proposed aboveground facilities would include clearing and grading; installation of foundations; construction of buildings, appurtenances, and auxiliary equipment; testing and startup; and final cleanup and stabilization as described below.

Clearing and Grading

Once survey crews have marked the boundaries of the construction work areas associated with the aboveground facilities, Midship Pipeline would clear the area of vegetation and install erosion control devices (e.g., silt fence, straw bales) to minimize soil runoff and sedimentation into off-site waterbodies, wetlands, roads, or other sensitive areas in accordance with the Plan and Procedures. Midship Pipeline would then grade the site to allow for safe passage of equipment and to prepare the work surface for construction activities.

Foundations

Midship Pipeline would install aboveground facility foundations where needed. Foundation installation involves the following general steps:

- excavate and improve/amend the soil as needed;
- install foundation forms and reinforcing bars (rebar) in the excavated areas;
- pour high-strength concrete to the required levels; and
- allow the concrete to cure to a suitable design strength.

Midship Pipeline would randomly sample and test concrete pours to verify quality and compliance with applicable specifications to make sure suitable foundations are obtained. Once the foundations have sufficiently cured, Midship Pipeline would install the aboveground facility buildings and machinery.

Compressor and Building Construction

At the compressor station sites, the machinery, buildings, and piping would be installed concurrently. Midship Pipeline would coordinate construction of the compressor buildings with the installation of the compressor skids on the foundations. Once the compressors are set in place, Midship Pipeline would erect the building's steel frames and install the exterior walls, insulation, interior wall panels, and then the roof. Flashing would be installed at cut-outs through the siding for the inlets and exhaust vents to create a weather-tight seal. Midship Pipeline would acoustically insulate each compressor building and install silencers on the engine exhaust stacks and the air intakes to abate noise (see section 4.11.2).

Sholem Booster Station Construction

At the Sholem Booster Station, Midship Pipeline would install two self-contained Caterpillar G3606 compressors onto a cured concrete slab. This type of compressor is typically built and installed to withstand the elements; therefore, no building is generally required. Midship Pipeline would then install prefabricated piping, after which the other ancillary equipment would be set in place and connected to the necessary piping, instrumentation, and electrical connections. Midship Pipeline would install silencers on the engine exhaust stacks and air intakes, and would erect sound attenuating wall panels around the entire booster station perimeter to abate noise (see section 4.11.2).

Piping

Piping, valves, and fittings would either be fabricated on site or prefabricated at the contractor's fabrication shop and transported to each aboveground facility site for installation. Midship Pipeline would begin installing the piping systems concurrently with the foundation work. Piping would require welded construction, except where connected to flanged or threaded components. For underground piping, Midship Pipeline would excavate a trench, lower-in the piping, and backfill the trench. Prior to installation, the piping would be welded, non-destructively inspected, and coated for corrosion protection. Midship Pipeline would install a cathodic protection system to further protect the underground piping from corrosion. The aboveground piping would be installed on concrete or metal pipe supports and then painted. Midship Pipeline would also install electrical conduit systems as needed.

Testing and Start-Up

Once the structures and equipment are set on foundations, Midship Pipeline would connect them to the piping and electrical conduit systems, install electrical wiring to provide power, and connect instrumentation to the control systems. Prior to start-up of the aboveground facilities, Midship Pipeline would test and calibrate the completed systems to ensure proper operation, which would include:

- hydrostatic testing the aboveground and belowground gas piping;
- thoroughly checking and testing the controls and safety devices (e.g., emergency shutdown system, relief valves, gas and fire detection devices); and

- conducting several short-duration trial runs of compressor units to verify proper operation of the safety and protective devices.

Once all testing is satisfactorily completed and in-service is authorized, Midship Pipeline would commence official start-up of the aboveground facility systems.

Final Cleanup and Stabilization

Midship Pipeline would conduct cleanup and stabilization of the aboveground facility sites prior to placing the facilities in-service and in accordance with the requirements of the Plan and Procedures.

2.4 CONSTRUCTION SCHEDULE

Construction of the project facilities would occur over an approximately 9-month period between fall of 2018 and summer of 2019. Midship Pipeline states it would begin construction as soon as possible after receiving all necessary federal authorizations with an estimated in-service date in late summer 2019.

Midship Pipeline would construct the pipeline facilities in two spreads, one for the northern portion of the Mainline and the entire Chisholm Lateral (Spread 1), and one for the southern portion of the Mainline and the entire Velma Lateral (Spread 2). Information regarding the anticipated construction workforce is included in section 4.9.2.

2.5 ENVIRONMENTAL COMPLIANCE INSPECTION AND MITIGATION MONITORING

2.5.1 Coordination and Training

Midship Pipeline would incorporate the mitigation measures identified in its permit applications as well as additional requirements of federal, state, and local agencies into its construction drawings and specifications. Midship Pipeline would also provide copies of applicable environmental permits and construction drawings and specifications to its construction contractors.

Midship Pipeline would develop an environmental training program tailored to the proposed project and its requirements. The program would be designed to ensure that:

- qualified environmental training personnel provide thorough and focused training sessions regarding the environmental requirements applicable to the trainees' activities;
- all individuals receive environmental training before they begin work;
- adequate training records are kept; and
- refresher training is provided as needed to maintain high awareness of environmental requirements.

2.5.2 Environmental Inspection

Midship Pipeline would be required to employ a minimum of three environmental inspectors (EI) per construction spread (a minimum of six total EIs) in accordance with the FERC staff's recommendation no. 7 (see section 5.2). The EIs would be on site during active construction and post-construction restoration of the pipelines and aboveground facilities and would have peer status with all other activity inspectors. The EIs' roles and responsibilities would be in accordance with the Plan and

Procedures, and would include the authority to stop construction activities that violate the measures set forth in the documents and permit authorizations for the project or to require other corrective actions to achieve environmental compliance.

In accordance with section II.B of the Plan, the EIs' responsibilities would include but not be limited to:

- inspecting construction activities for compliance with the requirements of the Plan and Procedures, the environmental conditions of FERC's Order, the mitigation measures proposed by Midship Pipeline (as approved and/or modified by the Order), other environmental permits and approvals, and environmental requirements in landowner easement agreements;
- identifying, documenting, and overseeing corrective actions, as necessary, to bring an activity back into compliance;
- verifying that the limits of authorized construction work areas and locations of access roads are visibly marked before clearing and maintained throughout construction;
- verifying that erosion control devices are properly installed and maintained to prevent sediment flow into sensitive environmental resource areas (e.g., wetlands, waterbodies, cultural resource sites, sensitive species habitats) and onto roads, and determining the need for additional erosion control devices; and
- keeping records of compliance with the environmental conditions of the FERC's Order, and the mitigation measures proposed by the project sponsor in the application submitted to FERC, and other federal or state environmental permits during active construction and restoration.

The EIs would also be responsible for providing training to project personnel regarding the project's environmental requirements and compliance reporting requirements.

2.5.3 FERC Third-Party Compliance Monitoring

Midship Pipeline has committed to funding a FERC third-party compliance monitoring program during the construction phase of the MIDSHIP Project. Under this program, a contractor is selected by, managed by, and reports solely to the FERC staff to provide environmental compliance monitoring services. The FERC Third-party Compliance Monitor(s) would report to FERC on compliance issues and make recommendations to the FERC Environmental Project Manager on how to deal with compliance issues, variance requests, and other construction changes, should they arise. In addition to this program, FERC staff would also conduct periodic compliance inspections during all phases of construction.

2.5.4 Post-Approval Variance Process

The pipeline alignment and work areas identified in the EIS should be sufficient for construction and operation (including maintenance) of the MIDSHIP Project. However, minor route realignments and other workspace refinements sometimes continue after the planning phase and during the construction phase. These changes could involve minor route realignments, shifting or adding new extra workspaces or staging areas, adding additional access roads, or modifying construction methods. We have developed a procedure for assessing impacts on those areas that have not been evaluated in the EIS and for approving or denying their use following any Certificate issuance. In general, biological and cultural

resources surveys were conducted using a survey corridor larger than that necessary to construct the facilities. Where survey approvals were denied, Midship Pipeline would complete the required surveys following a Certificate issuance, pending its approval. If Midship Pipeline requests to shift an existing workspace or require a new extra workspace subsequent to issuance of a Certificate, these areas would typically be within the previously surveyed area. We would typically review such requests using a variance request process.

A variance request for route realignments or extra workspace locations along with a copy of the survey results would be documented and forwarded to FERC in the form of a "variance request" in compliance with recommended condition number 5 in section 5.2 of this EIS. Variance requests typically include any additional surveys, landowner consultation, analyses, and/or resource agency consultations, and supporting documentation.

Typically, no further resource agency consultation would be required if the requested change is within previously surveyed areas and no sensitive environmental resources are affected. The procedures used for assessing impacts on work areas outside the survey corridor and for approving their use are similar to those described above, except that additional surveys, analyses, and resource agency consultations would be performed to assess the extent of any impacts on biological, cultural, and other sensitive resources and identify any avoidance or minimization measures that may be necessary. All variance requests for the project and their approval status would be documented according to FERC's compliance monitoring program. Any variance activity by Midship Pipeline and subsequent FERC action would be available on the FERC's e-Library webpage under the docket number for the project (CP17-458-000).

2.5.5 Post-Construction Monitoring

After construction, Midship Pipeline would conduct follow-up inspections of all disturbed upland areas to determine the success of restoration in accordance with the Plan. At a minimum, inspections must occur after the first and second growing seasons. Restoration of upland areas would be considered successful if, upon visual survey, the right-of-way vegetation is similar in density and cover to the adjacent undisturbed lands, construction debris is removed, and proper drainage has been restored. For at least 2 years following construction, Midship Pipeline would submit quarterly reports to FERC that document any problems identified by Midship Pipeline, landowners, or agencies and describe the corrective actions taken to remedy those problems.

In accordance with the Procedures, Midship Pipeline would monitor the success of wetland revegetation annually for the first 3 years after construction (or as required by permit) or until wetland revegetation is successful. Wetland revegetation would be considered successful when the cover of herbaceous and/or woody species is at least 80 percent of the type, density, and distribution of the vegetation in adjacent undisturbed wetland areas or as compared to documented, pre-project conditions (see section 4.4.4 for more information). In accordance with the Procedures, if revegetation is not successful at the end of 3 years, Midship Pipeline would develop and implement (in consultation with a professional wetland ecologist) a plan to actively revegetate the wetland, continue revegetation efforts as needed, and file a report annually documenting progress until revegetation is deemed successful.

After construction, FERC would continue to conduct oversight inspection and monitoring to assess the success of restoration. If it is determined that any of the restoration activities is not adequate at the end of the respective timeframes, Midship Pipeline would be required to extend its post-construction monitoring programs.

2.6 OPERATION, MAINTENANCE, AND SAFETY PROCEDURES

Midship Pipeline would operate and maintain the proposed pipeline and aboveground facilities in accordance with the DOT's regulations provided in 49 CFR 192, the Commission's guidance at 18 CFR 380.15, and the maintenance provisions of the Plan and Procedures. The pipeline right-of-way would be patrolled on a routine basis to identify erosion concerns occurring along the right-of-way, indications of possible leaks, areas of exposed pipe, third-party activity along the pipeline right-of-way, and any other conditions that could affect the safety and operation of the pipeline. Midship Pipeline would conduct measures necessary to repair or replace pipe segments as needed. Midship Pipeline would also periodically monitor and inspect the pipeline cathodic protection system to ensure proper and adequate corrosion protection.

Midship Pipeline would conduct routine maintenance of the proposed pipeline easement, which would include seasonal mowing in accordance with the requirements of the Plan and Procedures, terrace repair and backfill replacement, and periodic inspections of waterbody crossing sites. Emergency and routine maintenance would be performed as needed by well-qualified personnel.

The proposed compressor stations would be equipped with a range of automatic emergency detection and shutdown systems, which would be monitored on a 24-hour basis. In accordance with DOT regulations, Midship Pipeline would regularly inspect the proposed facilities for leaks as part of scheduled operations and maintenance (see section 4.12.1 for more information).

In accordance with the DOT's regulations at 49 CFR 192.707, Midship Pipeline would be required to place and maintain pipeline markers at crossings of roads, railroads, and other key points. The markers would indicate the presence of the pipeline and provide a telephone number where a company representative could be reached at all times (e.g., in the event of an emergency, before any third-party excavation in the area of the pipeline). Midship Pipeline would paint or replace all fence posts, signs, marker posts, aerial markers, and decals as needed to ensure that the pipeline locations are visible from the air and ground. In addition, Midship Pipeline participates in the "One Call" system for pre-excavation notifications through the national "811" call center.

3.0 ALTERNATIVES

As required by NEPA and FERC policy, we evaluated alternatives to the MIDSHIP Project to determine whether an alternative would be environmentally preferable and/or technically and economically feasible to the proposed actions while still meeting the project objectives. We evaluated the no-action alternative, system alternatives, route alternatives and variations, and aboveground facility site alternatives. These alternatives were evaluated using a specific set of criteria. The evaluation criteria applied to each alternative include a determination whether the alternative:

- meets the objectives of the proposed action;
- is technically and economically feasible and practical; and
- offers a significant environmental advantage over the proposed action.

Through environmental comparison and application of our professional judgment, each alternative is considered to a point where it becomes clear if the alternative could or could not meet the three evaluation criteria. To ensure a consistent environmental comparison and to normalize the comparison factors, we generally use desktop sources of information (e.g., publicly available data, geographic information system data, aerial imagery). Where appropriate, we also use site-specific information (e.g., field surveys or detailed designs). Our environmental analysis and this evaluation consider quantitative data (e.g., acreage or mileage) and uses common comparative factors such as total length, amount of collocation, and land requirements.

In recognition of the competing interests and the different nature of impacts resulting from an alternative that sometimes exist (i.e., impacts on the natural environment versus impacts on the human environment), we also consider other factors that are relevant to a particular alternative and discount or eliminate factors that are not relevant or may have less weight or significance.

The alternatives were reviewed against the evaluation criteria in the sequence presented above. The first consideration for including an alternative in our analysis is whether or not it could satisfy the stated purpose of the project. An alternative that cannot achieve the purpose for the project cannot be considered as an acceptable replacement for the project.

Many alternatives are technically and economically feasible. Technically practical alternatives, with exceptions, would generally require the use of common construction methods. An alternative that would require the use of a new, unique, or experimental construction method may not be technically practical because the required technology is not available or is unproven. Economically practical alternatives would result in an action that generally maintains the price competitive nature of the proposed action. Generally, we do not consider the cost of an alternative as a critical factor unless the added cost to design, permit, and construct the alternative would render the project economically impractical.

Alternatives that would not meet the project's objective or were not feasible were not brought forward to the next level of review (i.e., the third evaluation criterion). Determining if an alternative provides a significant environmental advantage requires a comparison of the impacts on each resource as well as an analysis of impacts on resources that are not common to the alternatives being considered. The determination must then balance the overall impacts and all other relevant considerations. In comparing the impact between resources, we also considered the degree of impact anticipated on each resource. Ultimately, an alternative that results in equal or minor advantages in terms of environmental impact would not compel us to shift the impacts from the current set of landowners to a new set of landowners.

With regard to the first criterion, Midship Pipeline's stated objective for the project is to provide an additional 1,440 MMcf/d of year-round firm transportation capacity to connect production from the SCOOP and the STACK plays in the Anadarko Basin in Oklahoma to existing natural gas pipelines for transport to growing Gulf Coast and Southeast markets. Our analysis of alternatives is based on project-specific information provided by the applicant, affected landowners, and other concerned parties; comments received during project scoping; publically available information; our consultations with federal and state agencies; and our own research regarding the siting, construction, and operation of natural gas transmission facilities and their impacts on the environment (i.e., our alternatives analysis is comment and resource driven). Unless otherwise noted, we used the same desktop sources of information to standardize comparisons between the project and each alternative. As a result, some of the information presented in this section relative to the project may differ from information presented in section 4.0, which is based on project-specific data derived from field surveys and engineered drawings.

3.1 NO-ACTION ALTERNATIVE

The Commission has two courses of action in processing applications under Section 7 of the NGA: 1) deny the requested action (the no-action alternative); or 2) grant the Certificate, with or without conditions. If the no-action alternative is selected by the Commission, the proposed facilities would not be constructed, and the short- and long-term environmental impacts from the project would not occur. In addition, if the no-action alternative is selected, the stated objectives of the project would not be met. The no-action alternative would eliminate this potential new natural gas pipeline system connecting the SCOOP and STACK plays to growing Gulf Coast and Southeast markets, causing existing and potential users of natural gas to either pursue other means of natural gas supply, to rely on other fuels (such as coal or fuel oil), or to seek other means to meet or curtail their energy needs.

If Midship Pipeline's proposed facilities are not constructed, the project shippers may need to obtain an equivalent supply of natural gas from new or existing pipeline systems. In response, Midship Pipeline or another natural gas transmission company would likely develop a new project or projects to provide the volume of natural gas contracted through the project's binding precedent agreements with the project shippers. Alternatively, customers of the project shippers could seek to use alternative fuel or renewable energy sources, which could require new facilities. While these projects potentially deliver equivalent amounts of energy, they would not fulfill the purpose and need of the project. Additionally, construction of new pipelines or other non-natural gas energy infrastructure would result in environmental impacts that could be equal to or greater than those of the MIDSHIP Project. For these reasons, we are not recommending the no-action alternative.

3.2 SYSTEM ALTERNATIVES

System alternatives would utilize existing, modified, or other proposed natural gas pipeline systems to meet the objectives of the project. Implementation of a system alternative would make it unnecessary to construct all or part of the project, although modifications or additions to existing or proposed systems could be required. These modifications or additions would result in environmental impacts that could be less than, similar to, or greater than those associated with construction and operation of the project. The purpose of identifying and evaluating system alternatives is to determine whether the environmental impacts associated with construction and operation of the project could be avoided or reduced by using another pipeline system, while still meeting the objectives of the proposed action.

A viable system alternative to the project would have to provide the pipeline capacity necessary to transport 1,440 MMcf/d of natural gas at the contracted volumes from the SCOOP and the STACK plays in the Anadarko Basin in Oklahoma to existing natural gas pipelines for transport to growing Gulf

Coast and Southeast markets. A viable system alternative would need to provide these services within a timeframe reasonably similar to the proposed project.

We are not aware of any natural gas pipeline systems proposed in the region that would meet the objectives of the MIDSHIP Project. There are several existing natural gas pipeline systems that operate in the vicinity of the project, including ONEOK Gas Transmission; Natural Gas Pipeline Company of America, LLC; Panhandle Eastern Pipe Line Company, LP; Enable Oklahoma Intrastate Transmission, LLC; and Southern Star Central Gas Pipeline, Inc. (see figure 3.2-1). However, most of these pipeline systems operate at or near capacity in their current configuration. Moreover, none of the existing pipeline systems are configured to receive and deliver natural gas based on the requirements of the project shippers. Additional pipeline looping, compression, and laterals would be required to transport the natural gas, which would likely result in similar environmental impacts. Therefore, none of these pipeline systems would offer a significant environmental advantage and we do not consider them to be preferable alternatives to the MIDSHIP Project.

3.3 ALTERNATIVE PIPELINE ROUTES

Major route alternatives include those that deviate from the proposed route for a significant distance and provide a substantially different pathway from the source area to the delivery area. Minor route variations typically involve minor shifts in the pipeline alignment to avoid a site-specific resource issue or concerns and are generally smaller in scale and shorter than major route alternatives.

Midship Pipeline developed the proposed project routing based on the receipt and delivery points identified by its customers. During this process, Midship Pipeline indicated that it attempted to maximize collocation with existing rights-of-way, avoid developed areas, and minimize impacts on sensitive resources. Midship Pipeline did not identify a major route alternative that would meet the project objectives, noting that any major route alternative would not differ substantially from the proposed route. We did not receive any comments during scoping suggesting that we evaluate any major route alternatives and, based on our review of the project, we did not identify any major route alternatives that would offer significant environmental advantages over the proposed route.

Midship Pipeline participated in our pre-filing process during the early design stage of the project (see section 1.3). This process emphasized identification of potential stakeholder issues, as well as identification and evaluation of alternatives that could avoid or minimize impacts. During this process, Midship Pipeline incorporated 20 route variations into the proposed route based on input from its environmental and engineering staff; landowner consultations; and to address constructability issues identified during field surveys. After the draft EIS was issued, Midship Pipeline incorporated an additional eight minor route variations into the proposed route to avoid environmentally sensitive areas or to address landowner concerns or constructability issues. Table 3.3-1 identifies the milepost location and the rationale for incorporating the variations into the proposed route. These route variations are now considered part of the proposed project and are included in our analysis of the project in section 4.0 of the EIS.

During our review of Midship Pipeline's project modifications filed after the draft EIS was issued, we identified one location where an environmentally preferable route may be feasible, but requires further constructability analysis by Midship Pipeline. Midship Pipeline has proposed to cross one new major waterbody (unnamed tributary to Caddo Creek [S-BR-TAS-17/10/25-07]) at Mainline MP 181.1 using the wet open-cut method. In section 4.3.2.6, we are recommending that, prior to construction, Midship Pipeline assess the feasibility of shifting the pipeline route to either avoid crossing the unnamed tributary to Caddo Creek or to reduce the crossing length.

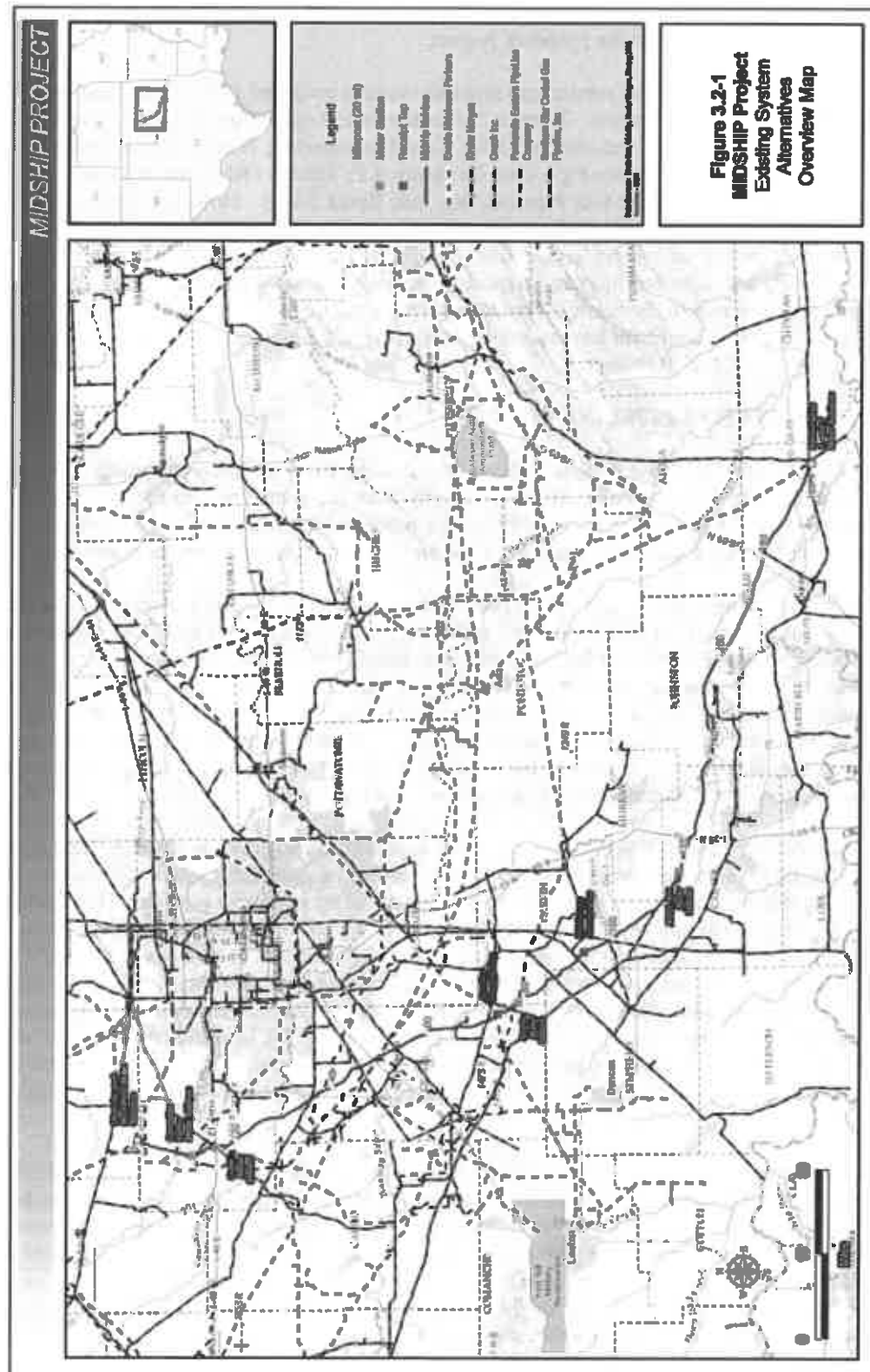


TABLE 3.3-1 Summary of Route Variations Incorporated into the Proposed Route for the MIDSHIP Project		
Route Variation	Milepost Location ^a	Reason Variation Incorporated
Route Variation 1	85.8–86.6	To increase collocation and address landowner concerns
Route Variation 2	CH13.6–CH14.7	To increase collocation and address landowner concerns
Route Variation 3	142.2–147.4	To avoid a high fence area, game refuge, and recently constructed dam/reservoir
Route Variation 4	1.7–2.3	To address landowner concerns
Route Variation 5	71.3–73.3	To increase the distance of the pipeline from a residence
Route Variation 6	73.2–74.0	To avoid steep side slopes
Route Variation 7	CH2.9–CH4.1	To address landowner concerns
Route Variation 8	114.6–117.1	To avoid impacts on a pecan orchard and planned subdivision
Route Variation 9	10.7–11.5	To address landowner concerns
Route Variation 10	14.7–15.7	To provide for sufficient space for construction by going around the Devon Energy Cana Natural Gas Processing Plant
Route Variation 11	152.2–152.9	To complete pipeline installation across Pennington Creek using the HDD construction technique
Route Variation 12	172.1–173.1	To complete pipeline installation across the Blue River using the HDD construction technique
Route Variation 13	CH8.8–CH10.6	To increase collocation and separation from a pond and intermittent stream
Route Variation 14	11.1–11.5	To avoid a pond and foreign pipeline crossing
Route Variation 15	80.2–80.7	To decrease the amount of tree clearing
Route Variation 16	82.1–82.8	To improve constructability
Route Variation 17	85.5–86.1	To reduce forestland impacts and improve road crossing
Route Variation 18	115–116.6	To avoid a pond
Route Variation 19	136.3–136.8	To improve road and stream crossings
Route Variation 20	195.2–196.0	To improve constructability and avoid crossing a pond
Route Variation 21	VE10.8–VE11.7	To avoid crossing a pond and an environmentally sensitive area
Route Variation 22	9.5–9.8	To avoid pipeline facilities being constructed by Cimarex
Route Variation 23	94.5–94.8	To avoid crossing an aboveground facility operated by Enable Energy
Route Variation 24	143.2–143.4	To avoid impacts on a private road
Route Variation 25	156.2–156.8	To address landowner concerns
Route Variation 26	7.3–8.0	To avoid crossing a flood control dike
Route Variation 27	VE9.4–VE9.5	To avoid a forested wetland
Route Variation 28	141.0–142.4	To minimize impacts on wetlands

^a The milepost prefixes "CH" and "VE" indicate the segment is part of the Chisolm or Velma Laterals, respectively.

We received comments from two landowners requesting that Midship Pipeline modify the pipeline alignment across their properties. In a letter dated February 20, 2017, landowner Norman Sloan provided comments and suggested that Midship Pipeline identify a route variation to avoid impacts on native bluestem grass on his property near Mainline MP 52.1. In a filing dated September 5, 2017, Midship Pipeline indicated that it had made several unsuccessful attempts to contact Mr. Sloan to discuss his concerns since April 2017. Midship Pipeline indicated that it would restore the disturbed right-of-way to pre-existing conditions using a seed mix containing native bluestem and other species approved by the landowner. We find these measures acceptable. We also encourage Midship Pipeline to continue its attempts to consult directly with Mr. Sloan. We note that environmental recommendation no. 5 would allow Midship Pipeline to make minor field realignments per landowner needs and requirements that do not affect other landowners or sensitive environmental areas.

In a letter dated October 4, 2017, Mark Schweitzer submitted comments requesting that Midship Pipeline avoid crossing a dike on his property near Mainline MP 7.3. Mr. Schweitzer indicated that he constructed the dike to prevent flooding from the North Canadian River and asked Midship Pipeline to avoid the dike by extending the North Canadian River HDD (which would extend the HDD by about 900 feet) or by following an alignment east of an existing Devon pipeline that crosses his property. Midship Pipeline indicated that it is evaluating the feasibility of extending the length of the HDD to span the North Canadian River and the dike on Mr. Schweitzer's property. In the draft EIS, we recommended that Midship Pipeline file with the Secretary the results of its feasibility assessment to extend the North Canadian River HDD or provide detailed information on any route adjustments and/or construction techniques developed in consultation with Mr. Schweitzer to minimize impacts on the dike. On March 29, 2018, Midship Pipeline filed comments on the draft EIS indicating it has incorporated a route variation into the proposed route to avoid crossing the dike (see route variation 26 in table 3.3-1) and provided correspondence from Mr. Schweitzer indicating that his concerns have been addressed.

Aside from the route variations addressed during the pre-filing process and the two landowner comments noted above, we did not receive any additional comments during scoping suggesting that we evaluate any other minor route variations and, based on our review of the project, we did not identify any additional minor route variations that would offer a significant environmental advantage over the proposed route.

3.4 ALTERNATIVE ABOVEGROUND FACILITY SITES

We evaluated the locations of the proposed aboveground facilities to determine whether environmental impacts would be significantly reduced or mitigated by the use of alternative sites. Our evaluation included review of desktop material as well as site visits along the project corridor.

Midship Pipeline proposes to construct eight new receipt meters and four new delivery meters at nine meter station sites:

- Chisholm Meter Station (one receipt meter);
- Okarche/Mark West Meter Station (two receipt meters);
- Canadian Valley Meter Station (one receipt meter);
- Cana Meter Station (one receipt meter);
- Iron Horse Meter Station (one receipt meter);
- Grady Meter Station (one receipt meter);
- Velma Meter Station (one receipt meter);
- NGPL 801 Meter Station (one delivery meter);

- NGPL Meter Station (one delivery meter); and
- Bennington Meter Station (two delivery meters).

We did not evaluate alternative locations for the meter stations as no specific concerns were raised during scoping and the station sites lack sensitive resources and generally are limited to those locations where shippers have indicated they would deliver or receive natural gas, which are essential to the project objective as previously discussed. We also did not evaluate alternative locations for MLVs, pig launchers, or pig receivers because they are either collocated with other aboveground facilities, are located entirely within the permanent pipeline right-of-way and/or would not affect sensitive resources, or their locations are partly determined by regulations.

During project planning, Midship Pipeline completed hydraulic modeling to determine optimum horsepower and compressor station location requirements to transport the proposed natural gas volumes. Midship Pipeline then evaluated potential compressor station locations based on site access and availability, land use, topography, and resources present. As part of its application, Midship Pipeline evaluated:

- one alternative site for the Calumet Compressor Station;
- two alternative sites for the Tatum Compressor Station;
- two alternative sites for the Bennington Compressor Station; and
- one alternative site for the Sholem Booster Station.¹

We reviewed the compressor station and booster station site alternatives and concluded that none of the alternative sites would be environmentally preferable to Midship Pipeline's proposed sites. Since filing its application, Midship Pipeline identified an alternative location for its Sholem Booster Station based on landowner input. The new site is on pastureland about 0.5 mile northeast of the previously proposed site. In addition, Midship Pipeline reconfigured the Tatum Compressor Station within the originally proposed site to reduce forest impacts. Our alternatives analysis is comment and resource driven. Because we did not receive any comments regarding possible alternative sites for these facilities and no significant impacts have been identified from their proposed siting as described in section 4 of this EIS, we did not further evaluate alternative sites.

Electric-driven compressor units were also considered by Midship Pipeline for the compressor stations and booster station. However, Midship Pipeline indicated that the existing electric transmission line system would need to be expanded and upgraded in order to serve the power requirements of the facilities. Based on our review, use of electric-driven compressor units would require the construction of a minimum of 2.8 miles of new transmission lines, which would affect more land during construction and operation. Because air emissions associated with operation of the compressor and booster stations would not exceed the National Ambient Air Quality Standards (NAAQS) and because the use of electric-driven compressor units would require the construction of new transmission lines and increase land disturbance, we did not further evaluate electric-driven compressor units.

In summary, we have determined that Midship Pipeline's proposed project, as modified by our recommended mitigation measures, is the preferred alternative that can meet the project objectives.

¹ Midship Pipeline's application is available for download on the FERC website under Docket No. CP17-458-000 at https://elibrary.ferc.gov/idmws/file_list.asp?accession_num=20170531-5363.

